

Materials for a Flora of the Malayan Peninsula—By GEORGE KING, M. B., LL. D., F.R.S., C.I.E., Superintendent of the Royal Botanic Garden, Calcutta.

No. 6.

ORDER XX. LINEÆ.

Herbs or shrubs. *Leaves* usually alternate, simple, entire, rarely crenate-serrate; stipules lateral or intrapetiolar or 0. *Inflorescence* various. *Flowers* regular, bisexual. *Sepals* 5, rarely 4, free or connate below, imbricate. *Petals* as many, hypogynous or slightly perigynous, usually fugacious, often contorted. *Stamens* 4-5, with as many interposed staminodes, or 8-10, (rarely more) filaments united at the base into a hypogynous or slightly perigynous ring, filiform; anthers versatile, 2-celled. *Glands* 5, entire or 2-lobed, usually adnate to the staminal ring, or obsolete. *Ovary* entire, 3-5 celled; styles 3-5, free or more or less connate, stigmas terminal; ovules 1 or 2, inserted in the inner angle of the cells, anatropous, pendulous. *Fruit* usually splitting into 3-5 cocci, rarely a drupe. *Seeds* 1-2 in each cell, testa sometimes winged, albumen fleshy or 0; embryo nearly as long as the seed, straight, rarely incurved, cotyledons broad, radicle superior.—**DISTRIB.** All regions; genera 14, species about 145.

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| Petals contorted, fugaceous; perfect stamens 2 or 3 times as many as the petals. Fruit drupaceous. Scandent herbs with hooked lateral branchlets | 1 <i>Roucheria</i> . |
| Petals imbricate, with scales on their inner faces, ultimately deciduous; perfect stamens twice as many as the petals. Fruit drupaceous. Shrubs or trees | 2 <i>Erythroxydon</i> . |
| Petals contorted, persistent; stamens 2 to 4 times as many as the petals. Fruit capsular, septicidal | 3 <i>Ixonanthes</i> . |

1. ROUCHERIA, Planch.

Erect or climbing trees or shrubs with revolute woody tendrils. *Leaves* quite entire or glandular-serrate, coriaceous, penninerved; stipules minute, caducous. *Flowers* axillary, yellow, sessile, or in excessively short fascicled spikes; pedicels bracteolate. *Sepals* 5. *Petals* 5, hypogynous, contorted, fugacious. *Stamens* 10, all fertile, filaments connate into a short tube below. *Glands* obsolete. *Ovary* 3-5-celled.

styles 3-5, filiform, stigmas cuneate, 2-lobed; ovules 2, collateral. *Drupe* scarcely fleshy, subglobose; stone 3-6-angled, bony, cells 1-2-seeded. *Seeds* compressed, pendulous; albumen rather fleshy, embryo with foliaceous cotyledons and an elongate radicle.—DISTRIB. 3 or 4 species, one or more Malayan and 2 from Guiana.

1. ROUCHERIA GRIFFITHIANA, Planch. in Hook. Journ. Bot. VI, 143: VII, 527. A glabrous climbing shrub with hooked lateral branchlets. *Leaves* alternate, lanceolate, oblanceolate or elliptic-lanceolate, rather bluntly caudate-acuminate, obscurely crenate-serrate, the base cuneate; main nerves faint, 6 to 8 pairs, curving; length 3 to 5 in., breadth 1·2 to 1·6 in.; petiole ·35 to ·5 in., slender. *Flowers* ·35 in. in diam., in dense shortly-pedicelled clusters of 7 or 8. *Petals* narrowly oblong, obtuse, very fugaceous, thin. *Drupe* ovoid, ·25 in. long, the pulp thin. Hook. fil. Fl. Br. Ind. I, 414.

In all the provinces except the Andamans and Nicobars. DISTRIB. Sumatra, Borneo.

2. ERYTHROXYLON, Linn.

Shrubs or small trees, usually quite glabrous. *Leaves* alternate, entire, often subdistichous; stipules intrapetiolar, often imbricating on short arrested leafless branches. *Flowers* axillary, small, white or pink, solitary or fascicled, peduncles bracteolate. *Sepals* 5, rarely 6, free or connate. *Petals* 5, hypogynous, deciduous, with an erect double ligula on the inner face, imbricate. *Stamens* 10, rarely 12, filaments united into a glandular or eglandular tube. *Ovary* 3- rarely 4-celled; styles 3, rarely 4, free or connate, stigmas capitate; ovules, 1, rarely 2 in each cell. *Drupe* 1-celled, 1-seeded. *Seed* with a thin testa, albumen variable in quantity or 0; embryo straight, cotyledons plano-convex, radicle short.—DISTRIB. Species about 50, mostly American, and tropical.

1. ERYTHROXYLON BURMANICUM Griff. Notul. IV, 468: Ic. Pl. Asiat. t. 581, f. 3. A glabrous tree 20. to 30 feet high. *Leaves* elliptic or obovate-elliptic, obtuse or slightly emarginate, the base cuneate; upper surface shining, the lower glaucous, both with open reticulations; the main nerves about 8 pairs, not more prominent than the secondary; length 1·75 to 2·5 in., breadth ·75 to 1·25 in., petiole ·2 to ·3 in. *Flowers* in clusters of 2 to 4, their pedicels about ·25 in. long. *Fruit* cylindrical-clavate, shining, ·5 in. long; the calyx and staminal tube sub-persistent. Hook. fil. Fl. Br. Ind. I, 415; Kurz For. Fl. Burma I, 171. *E. sumatranum*, Miq. Fl. Ind. Bat. Suppl. 572. *E. retusum*, Bauer ex Teysm. and Binn. in Tijdsch Nat. Ver. Ned. Ind. XXVIII, 71. *Ficus cuneata*, Wall. Cat. 4534.

In all the provinces. DISTRIB. Burma, Sumatra.

3. IXONANTHES, Jack.

Glabrous trees, often turning black in drying. *Leaves* alternate, entire or crenate-serrate, reticulate; stipules minute or 0. *Flowers* small, in axillary cymose dichotomous peduncled panicles. *Sepals* 5-6, shortly connate at the base. *Petals* 5-6, perigynous, contorted, persistent, hardened round the fruit. *Stamens* 10-20, inserted on the outside of a perigynous annular or cupular eglandular disk. *Ovary* free, 5-celled, cells perfectly or imperfectly 2-locellate; style simple, stigma capitate, lobed; ovules 10. *Capsule* coriaceous or woody, oblong or conic, more or less perfectly 10-celled, septicial, carpels opening inward. *Seeds* winged or crowned with a mitriform aril, albumen fleshy; embryo lateral, cotyledons foliaceous, radicle superior.—*DISTRIB.* Species 3-4, chiefly Malayan.

Leaves oblong-oblancheolate to obovate-oblong,
petals .2 in. long. Capsules .7 in. long,
imperfectly 10-celled 1 *I. icosandra*.

Leaves elliptic to elliptic-rotund, not obovate;
petals .3 in. long. Capsules 1.35 to 1.75 in.
long, almost completely 10-celled 2 *I. reticulata*.

1. IXONANTHES ICOSANDRA, Jack Mal. Miscel. II, No. 7 p. 53: Hook. Comp. Bot. Mag. I, 154. A tree 30 to 40 feet high. *Leaves* coriaceous, oblong-oblancheolate to obovate-oblong, the apex blunt or much rounded; the edges entire, obscurely serrate or crenate, the base cuneate: main nerves spreading, sub-horizontal, faint, about 10 to 12 pairs: length 2.5 to 5.5 in., breadth 1 to 2.5 in., petiole .25 to .5 in. *Cymes* on slender peduncles, many-flowered. *Flowers* ovoid, .2 in. long, scarcely opening; petals broadly elliptic: stamens 12 (usually), the filaments, much longer than the petals. *Capsule* narrowly ovoid, .7 to .8 in. long, 5-valved, imperfectly 10-celled. *Seeds* 10, on elongated podosperms. Hook. fil. Fl. Br. Ind. I, 416; Miq. Fl. Ind. Bat. i, pt. 2, 494. *I. dodecandra*, Griff. Plant. Cantor 12. *I. cuneata*, Miq. Fl. Ind. Bat. Suppl. 484 and Hook. fil. Fl. Br. Ind. I, 416. *I. obovata* Hook. fil. Fl. Br. Ind. I, 417. *Gordonia? peduncularis*, Wall. Cat. 4409. *Hypericinea dentata*, Wall. Cat. 4832. *Pierotia lucida*, Blume Mus. Bot. i. 180. *Brewstera crenata*, Roem. Synops. i. 141. *Macharisia icosandra*, Planch. MSS. *Ixonanthes* sp. Griff. Notul. iv. 498; Ic. Pl. Asiat., t. 589, f. 2.

In all the provinces except the Nicobars and Andamans; very common.

This is rather a variable plant as to leaves, and to two of the forms specific names have been given. I cannot, however, discover any tangible differences in the flowers or fruit, so I have treated all the forms

as belonging to Jack's *I. icosandra*. The fruit is only imperfectly 10-celled in this species, the vertical processes from the back walls of the cells of the capsule being incomplete. In the next species they are nearly quite complete, and its capsules are really 10-celled.

2. *IXONANTHES RETICULATA*, Jack in Mal. Miscel. II, No. 7, 51; Hook. Comp. Bot. Mag. I. 154. A small tree, occasionally only a shrub. *Leaves* coriaceous, not black when dry, elliptic, sometimes elliptic-rotund, the apex blunt, the base cuneate; main nerves 7 or 8 pairs, slightly prominent when dry, interarching .25 in. from the edge; length 3.5 to 5 in., breadth 2 to 2.75 in., petiole .6 to .8 in. *Cymes* on stout peduncles, few-flowered. *Flowers* ovoid to ovoid-rotund, scarcely opening, .3 in. long, petals broadly elliptic; stamens about 10, the filaments much longer than the petals. *Capsule* 1.35 to 1.75 in. long, 5-valved, 10-celled. Hook. fil. Fl. Br. Ind. I, 417; Griffith Plant. Cantor, 11. *Hypericinea macrocarpa*, Wall. Cat. 4833. *Gordonia decandra*, Roxb. Fl. Ind. ii., 573; Wall. Cat. 4408.

In all the provinces except the Nicobar and Andaman Islands. **DISTRIB.** Sumatra.

In this species the 5 cells of the fruit are converted into 10 by a dissepiment springing from the wall of each valve. I have never seen the seeds, all the capsules I have met with being empty.

ORDER XXI. MALPIGHIACEÆ.

Trees or shrubs, often climbing. *Leaves* (in the Indian genera) opposite, quite entire; stipules small or 0. *Inflorescence* axillary or terminal; pedicels articulate, usually 2-bracteolate. *Flowers* middling-sized or small, white or yellow, more rarely red, yellow, or blue, hermaphrodite, regular or irregular. *Calyx* usually 5-partite; segments imbricate or valvate, 1 or more (never all) furnished with a large gland, rarely eglandular (*Aspidopterys*). *Petals* 5, clawed or not, often fimbriate, imbricate. *Disc* obscure. *Stamens* 10, hypogynous or subperigynous, equal, or 1 or more much larger than the others, filaments free or connate below, anthers 2-lobed. *Ovary* 3-celled; styles 1-3, rarely 4, straight or circinate, stigmas capitate or punctiform or lateral; ovules solitary in each cell, micropyle superior, raphe ventral. *Fruit* (in all the Asiatic genera except *Brachylophon*) of one or more winged samaras. *Seed* exalbuminous; embryo straight or curved, radicle superior.—**DISTRIB.** An order, largely represented in America, but scantily in Asia; genera about 50, species about 620.

Styles 1 rarely 2; calyx glandular.

Fruit of 3, united, many-winged samaras ... 1. *Tristellateia*.

Fruit usually of a single 3-winged samara ... 2. *Hiptage*.

Styles 3 rarely 4; calyx eglandular.

Samaras with large membranous reticulate

wings 3. *Aspidopterys*.

Fruit of 2 or 3 turgid almost wingless cocci 4. *Brachylophon*.

1. TRISTELLATEIA, Thouars.

Woody climbers. *Leaves* opposite or whorled; petiole 1-2-glandular at the apex; stipules minute. *Flowers* yellow, in terminal or lateral racemes. *Calyx* 5-partite, eglandular, or with minute glands. *Petals* 5, clawed. *Stamens* 10, all perfect; filaments rigid, truncate and articulate at the top, anthers acute. *Ovary* 3-lobed; styles 1-2, slender, one or more reduced to small papillæ. *Ripe carpels* 3, each with about 3 or more wings, the whole forming a stellate fruit. *Seed* obovoid, testa membranous; cotyledons fleshy, hooked.—**DISTRIB.** About 8 species, natives of tropical Africa, Asia, and Australasia.

1. TRISTELLATEIA AUSTRALASICA, A. Rich. Sert. Astrol. 38 t. 15. Glabrous; *leaves* elliptic, ovate, or oblong, acute, the base cuneate or rounded; main nerves 4 or 5 pairs, forming wide arches far from the margin, faint; length 1·75 to 3·5 in., breadth ·75 to 1·25 in., petiole ·25 to ·35 in., eglandular or with only one gland. *Racemes* 2 to 6 in. long, few-flowered, terminal. *Flowers* 1 in. in diam., their pedicels opposite, minutely 2-bracteolate towards the base. *Petals* ovate. *Fruit* ·5 in. in diam., its wing linear-oblong, coriaceous, recurved or spreading. Hook. fil. Fl. Br. Ind. I, 418; Benth. Flor. Austral. I. 286. *Platynema laurifolium*, W. & A. in Edin. New Phil. Journ. 1833, 179; Prodr. 107.

Singapore; Wight, Kurz, Anderson. Pangkore, Scortechini. Pahang, Ridley. **DISTRIB.**—Malayan Archipelago, Australasia.

2. HIPTAGE, Gærtner.

Climbing or suberect shrubs. *Leaves* opposite, quite entire, coriaceous, eglandular, or with a row of remote intramarginal glands beneath; stipules 0. *Racemes* terminal or axillary, simple or compound; peduncles erect, bracteate, jointed to the 2-bracteolate pedicels. *Calyx* 5-partite; glands adnate to the pedicel, large. *Petals* 5, clawed, unequal, white, the odd one discoloured. *Stamens* 10, all fertile, declinate, one much larger than the others; filaments connate at the base. *Ovary* with 3 appendiculate lobes; styles 1 or 2 bearing stigmas, the others rudimentary, all circinate. *Fruit* winged. *Seed* sub-globose, the cotyledons unequal, thick. **DISTRIB:** four tropical Asiatic species.

Main nerves of leaves about 4 pairs, inflorescence tomentose or sericeous, flowers ·35 to

·5 in. in diam 1. *H. sericea*.

Main nerves of leaves 4 to 6 pairs, inflorescence
adpressed-pubescent; flowers .75 to 1 in., in
diam. 2. *H. madablota*.

1. HIPTAGE SERICEA, Hook. fil. Fl. Br. Ind. I, 419. A woody climber, the branches and inflorescence more or less covered with soft brown, villous pubescence; lateral branchlets slender, short. *Leaves* elliptic-ovate or oblong, acuminate, glabrous; main nerves about 4 pairs, ascending; length 2 to 6 in., breadth .9 to 3 in., petiole .25 in. *Racemes* 2 to 3.5 in. long, axillary and terminal, sometimes much crowded, minutely tomentose or sericeous, many-flowered. *Flowers* .35 to .5 in. in diam., pedicels thickened at the apex, .25 to .5 in. long. *Petals* clawed, the odd one much lobed, all more or less villous especially externally; central wing of carpel oblanceolate obtuse, with a central ridge near its base, 1.5 to 2 in. long, the lateral much smaller. *H. parviflora*, Wight Cat. 358. *Clerodendron sericeum*, Wall. Cat. 1814.

Penang: Wallich, King's collector, No. 1454. Singapore, Ridley. Pahang, Ridley No 2386. Malacca, Griffith, Derry. Maingay, (Kew Distrib.) No. 272. Perak, King's collector No. 4097.—DISTRIB. Burmah. Gallatly, No. 890.

This is a very variable plant as to leaves, some of the forms having narrowly oblong, while others have broadly elliptic leaves; the nervation is, however, alike in all. As regards vestiture there is also variation, the inflorescence being in some villous, in others minutely tomentose or pubescent. This must come very near, if it be not actually identical with, *H. javanica*, Blume. The Burmese form of this species has not only narrowly oblong leaves, but racemes 6 inches long and more slender than in Malayan specimens. I propose to name it var. *longe-racemosa*.

2. HIPTAGE MADABLOTA, Gærtn. Fruct. II, 169, t. 116. A glabrous woody climber, the young parts and inflorescence hoary or adpressed-tomentose, the branches stout. *Leaves* coriaceous, ovate-lanceolate, oblong or ovate-oblong, acute or shortly acuminate, the base rounded or cuneate, both surfaces glabrous: main nerves 4 to 6 pairs, oblique, slightly prominent beneath; length 4.5 to 6 in., breadth 1.5 to 3 in., petiole .25 to .4 in. *Racemes* 1 to 6 in. long, axillary, sometimes leafy, adpressed-pubescent. *Flowers* .75 to 1 in. in diam., fragrant. *Sepals* obtuse, less than half as long as the petals. *Petals* fimbriate, the odd one dashed with yellow. *Fruit* with three coriaceous spreading wings, the middle one oblanceolate, obtuse, 1 to 2 in. long, the 2 lateral linear and half as large. Hook. fil. Fl. Br. Ind. I, 418; Kurz For. Flora Burma I, 173; Miq. Fl. Ind. Bat. I, Pt. 2, 585; DC. Prod. I, 583; W. and A. Prod. 107; Wight Ill. t. 50. *Molina racemosa*, Lamk. Diet. IV, 227; Cav. Diss. IX. t. 263. *Gærtnera racemosa*, Roxb. Cor. Pl. I. t. 18; Fl. Ind. II, 368.

Banisteria bengalensis, Linn. *B. unicapsularis*, Lamk. *B. tetraptera*, Sonnerat Voy. II, t. 135. Rheede Hort. Malab. VI, t. 59.

In all the provinces. **DISTRIB.** British India, China, Malayan Archipelago.

3. ASPIDOPTERYS, A. JUSS.

Shrubs, usually climbing. *Leaves* opposite, eglandular, quite entire; stipules 0. *Flowers* in simple or compound axillary and terminal panicles; peduncles bracteate, jointed at the top, pedicels often minutely 2-bracteolate. *Flowers* small, yellow or white. *Calyx* short, 5-partite, eglandular. *Petals* 5, not clawed, spreading or reflexed, quite entire. *Stamens* 10, all perfect, filaments connate or distinct at the base. *Ovary* 3-lobed, lobes flattened at the back, sides winged; styles 3, glabrous, stigmas capitate. *Fruit* of 1-3 samaras; nucleus sometimes crested or winged at the back, and surrounded with a broad oblong or orbicular wing. *Seeds* oblong, subterete; embryo, straight, cotyledons equal, radicle short.—**DISTRIB.** Species about 15; all tropical Asiatic.

Leaves ovate or obovate, more or less orbicular; panicles slender, lax, with short few-flowered lateral branches: samaras ovate, narrowed and retuse at the apex ... 1 *A. concava*.

Leaves ovate or elliptic, narrowed upwards, not orbicular; panicles spreading, the branches umbellate, many-flowered: samaras orbicular 2 *A. Helferiana*.

1. ASPIDOPTERYS CONCAVA, A. JUSS. in Archiv. Mus. Hist. Nat. III, 509. A climber; young shoots rusty-puberulous, soon becoming glabrous. *Leaves* ovate-elliptic or elliptic, bluntly and shortly acuminate, the base rounded or very slightly narrowed: both surfaces glabrous, the lower minutely dotted when young; main nerves 4 to 6 pairs, curving, ascending; length 3 to 4.5 in., breadth 1.5 to 2.3 in., petiole .5 to .65 in. *Flowers* in spreading lateral umbellate panicles. *Samaras* orbicular, membranous, pale, reticulate, the veins radiating, the nucleus winged, about 1.25 in. in diam; their pedicels slender, minutely bracteolate, often 1.5 in. long. Hook. fil. Fl. Br. Ind. I, 420; Kurz For. Flora Burmah, I, 175. *Hiraea concava*, Wall. Pl. As. Rar. I, 13; Cat. 1061. *H. merguensis*, Wight. Ill. I, 139.

Penang; Curtis No. 138, 798. **DISTRIB.** Burmah.

2. ASPIDOPTERYS HELFERIANA, Kurz Journ. As. Soc. Bengal, Pt. 2, (1874), 137, 184; For. Flora Burma, I., 176. A climber, the young shoots tawny-pubescent. *Leaves* membranous, orbicular-ovate to orbicular-obovate, the apex shortly cuspidate, the base rounded or slightly

cordate, glabrous; main nerves 4 or 5 pairs, curved, ascending; length 3 to 5·5 in., breadth 2·5 to 5 in.; petiole ·5 to ·65 in., puberulous or glabrescent. *Panicles* axillary or terminal, slender, lax, rusty-puberulous when young, the lateral branches distant, few-flowered; ovary quite glabrous, lobes of disc scarcely rugose. *Samaras* ovoid, narrowed towards the retuse apex, membranous, pale brown, with many radiating nerves, reticulate, glabrous, 1 in. or more in length, nucleus with oblong wing. *Hiraea indica* (?) Wall. Cat. 1057.

Andaman Islands. DISTRIB. Burmah.

The type of this species is one of the things included under Wall. Cat. 1057, with which the Andaman specimens in the Calcutta Herbarium agree very well. Kurz has however also referred to this species certain Burmese specimens, *viz.*, Falconer's No. 72 (from Upper Weingo Valley) and Helfer's No. 923, which, although agreeing with each other, hardly agree with the Wallichian No. 1057 from Neidann. By the way! this sheet from Neidann is not included in Wallich's lithographed and published list.

4. BRACHYLOPHON, Oliver.

Glabrous shrubs. *Leaves* opposite, entire. Inflorescence terminal, racemose or corymbose, bracteolate. *Flowers* yellow. *Calyx* 5-partite, eglandular. *Petals* 5, imbricate in bud. *Stamens* 10, all perfect, the alternate shorter; filaments longer than the anthers, flat, conjoined at the base into a short disc: anthers linear, basifixed, opening by 2 apical pores. *Ovary* deeply 3-4-lobed, 3-4-celled; *Styles* 3 or 4, elongate, slender, divergent: ovules solitary in each cell, pendulous, anatropous. *Fruit* usually 3-, sometimes only 2-lobed; separating when ripe into turgid cocci; each coccus keeled along the back, and at the apex produced into a very short wing. *Seed* unknown. DISTRIB. Three species; all Malayan.

Rachides of the racemes ·5 in. long or less,
leaves coriaceous 1 *B. Hullettii*.

Rachides of the racemes 2 in. or more in
length.

Main nerves of leaves 7 to 8 pairs, oblique 2 *B. Curtisii*.

Main nerves of leaves 13 to 15 pairs, sub-
horizontal 3 *B. Scortechinii*.

1. BRACHYLOPHON HULLETTII, King, n. sp. *Leaves* coriaceous, shining, minutely reticulate, narrowly elliptic, shortly and abruptly acuminate or acute, the base cuneate: main nerves 10 to 12 pairs, rather prominent beneath, sub-horizontal, interarching far from the margin; length 4 to 7 in., breadth 1·8 to 2·5 in., petiole ·1 in. *Racemes* terminal, the

rachis less than .5 in. long, 4-to 8-flowered; pedicels .75 in. long, bracteolate at the base. *Sepals* ovate, blunt.

Malacca: on mount Ophir, Hullett.

An imperfectly known plant, easily distinguished from both the other species by its much shorter racemes and more coriaceous leaves.

2. BRACHYLOPHON CURTISII, Oliver in Hook, Ic. Plantar. t. 1566. A shrub 3 to 6 feet high. *Leaves* membranous, narrowly elliptic to ovate-rotund, acuminate, the base cuneate; upper surface glabrous, the lower scaberulous; main nerves 7 or 8 pairs, not much more prominent than the intermediate, oblique, interarching .15 in. from the edge; length 3.5 to 7 in., breadth 2 to 2.25 in., petiole .1 in. *Racemes* corymbose, 1 to 2 in. long. *Flowers* .75 in. in diam.; pedicels slender, .8 to 1.2 in. long, bracteolate at the base. *Petals* yellow, oblong, obtuse, entire, shortly clawed, .5 in. long. *Ripe fruit* .35 to .5 in. long, .25 in. broad.

Penang: Curtis No. 231.

3. BRACHYLOPHON SCORTECHINII, King, n. sp. A shrub 3 to 6 feet high. *Leaves* membranous, oblong-lanceolate to oblong-elliptic, sometimes oblong-oblongeolate, tapering from the middle to each end, both surfaces glabrous: main nerves 13 to 15 pairs, rather faint, sub-horizontal, interarching .15 to .2 in. from the edge: length 5 to 11 in., breadth 2 to 4 in., petiole .15 in. *Racemes* corymbose, terminal and axillary, 2 to 3 in. long, many-flowered, the rachis tuberculate. *Flowers* about .6 in. in diam.; pedicels slender, .65 to 1 in. long, bracteolate at the base. *Calyx-teeth* oblong, obtuse, puberulous, the edges ciliolate. *Petals* ovate, obtuse, entire, glabrous, .5 in. long. *Filaments* flattened, unequal but all much longer than the petals. *Ovary* 3- to 4-lobed, or 3- to 4-celled: styles 3 or 4, as long as the filaments, spreading, cylindrical. *Fruit* unknown. *Ryssopteris elliptica*, Scortechini MSS.

Perak: Scortechini, Wray, King's collector.

I have not seen fruit of this. In its flowers it closely resembles *B. Curtisii*, Oliver, but its leaves are larger, more membranous, and have more numerous nerves than those of *B. Curtisii*.

ORDER XXII. GERANIACEÆ.

Herbs, undershrubs, or rarely trees; glabrous or more usually pubescent and glandular. *Leaves* opposite or alternate, usually 2-stipulate. *Peduncles* usually solitary and axillary, 1- or more flowered. *Flowers* umbelled, cymose or racemose, usually showy, hermaphrodite, regular or irregular. *Sepals* 5, rarely 4 or 2, free or united to the middle, imbricate or rarely valvate, the posticous sometimes spurred. *Petals* as many as the sepals or fewer by suppression, or 0, hypogynous or subperigynous, variously imbricated, rarely contorted. *Torus* scarcely

expanded into a disc, with 5 glands alternating with the petals, or without glands, raised in the centre into a beak, rarely flat. *Stamens* as many as, or double, or treble the sepals, or fewer by suppression; filaments filiform or dilated, or connate into a ring; anthers 2-celled; cells parallel, opening lengthwise. *Ovary* 3-5-lobed, 3-5-celled, rarely 2-lobed, of 3-5-carpels, united with the axis as far as the insertion of the ovules, sometimes lengthened into a beak-bearing style or styles, which are free or more or less united; stigmas capitate, linear or ligulate; ovules 1 or 2 or rarely more, horizontal or pendulous or ascending. *Fruit* capsular, 3-5-lobed, lobes 1-seeded, often separating from the axis, septical or loculicidal, rarely berried. *Seeds* pendulous or horizontal, albumen 0, or scanty or fleshy; embryo straight or curved; cotyledons flat, convex or variously folded, foliaceous or thick or fleshy; radicle either short and near the hilum, or longer and inflected, or incumbent on the cotyledons.—**DISTRIB.** Genera 20, with about 800 species, chiefly inhabiting temperate climates.

OXALIDÆE.—Leaves compound, flowers regular.

Herbaceous.

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| Leaves 3-foliolate | ... | ... | 1. <i>Oxalis.</i> |
| Leaves pinnate | ... | ... | 2. <i>Biophytum.</i> |

Woody.

- | | | | |
|---|-----|-----|------------------------|
| Shrubs or trees, not scandent, fruit probably indehiscent | ... | ... | 3. <i>Connaropsis.</i> |
| Scandent shrubs, fruit certainly dehiscent | | | 4. <i>Dapania.</i> |

BALSAMINÆE.—Leaves simple, flowers irregular.

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|--|-----|-----|----------------------|
| Lateral petals connate in pairs, fruit capsular. | | | 5. <i>Impatiens.</i> |
| Lateral petals free: fruit drupaceous | ... | ... | 6. <i>Hydrocera.</i> |

1. OXALIS, Linn.

Acid herbs, rarely shrubby. *Leaves* radical or alternate, stipulate or ex-stipulate, compound, usually 3-foliolate. *Flowers* on axillary, 1- or more flowered peduncles, regular. *Sepals* 5, imbricate. *Petals* 5, hypogynous, contorted. *Glands* of the disc 0. *Stamens* 10, free or united at the base, all anther-bearing. *Ovary* 5-lobed, 5-celled; styles 5, distinct; stigma terminal, capitate, 2-fid or laciniate: ovules 1 or more in each cell. *Capsule* with loculicidal dehiscence, valves persistent to the axis. *Seeds* with an outer fleshy coat which bursts elastically, testa crustaceous, albumen fleshy, embryo straight.—**DISTRIB.** Species about 200, chiefly tropical and temperate S. American and S. African.

1. *OXALIS CORNICULATA* Linn. DC. Prod. I, 692. A diffuse, creeping, adpressed-pubescent herb with long-petioled 3-foliolate, stipulate

leaves; the leaflets obcordate, the stipules adnate to the petiole. *Flowers* sub-umbellate on 2- to many-fid, setaceous bracteolate peduncles. *Sepals* obtuse. *Petals* obcordate, yellow. *Fruiting pedicels* often depressed. *Capsules* sub-cylindric, tomentose, many-seeded. *Seeds* transversely striate. Hook. fil. Fl. Br. Ind. I, 436; Miq. Fl. Ind. Bat. I, pt. 2. p. 135; Boiss. Fl. Orient. i., 866; Wall. Cat. 4347; Roxb. Fl. Ind. ii. 457; W. & A. Prodr. 142. *O. repens*, Thunb; Wight Ic. t. 18; Blume Bijdr. 243. *O. pusilla*, Salisb.; Roxb. l.c.

Perak: by the sides of damp foot-paths near the bases of the hills.
 Penang: on Government Hill, Curtis.

2. BIOPHYTUM, De Cand.

Annual, rarely perennial herbs, with simple or branched stems. *Leaves* abruptly pinnate, fasciated or almost whorled at the top of the stem; leaflets opposite, oblique; petiole swollen at the base. *Peduncles* terminal, pedicels umbelled. *Flowers* small, yellow, or white. *Sepals* 5, lanceolate, acuminate. *Petals* 5. *Stamens* 10; filaments free, 5 outer smaller. *Styles* 5, stigmas notched at the apex or 2-fid. *Capsule* ovoid or oblong, or subglobose, splitting loculicidally sometimes to the base into 5 spreading valves. *Seeds* as in *Oxalis*.—DISTRIB. Tropical Asia, Africa, and America. Species about 20.

Leaflets 8 to 20 pairs, equal-sided, glabrous, their bases truncate, slightly oblique; flower-pedicels usually shorter than the sepals, petals yellow 1. *B. sensitivum*.

Leaflets 18 to 25 pairs, unequal-sided, sparsely hispid on upper surface, their bases obliquely truncate; flower-pedicels longer than the sepals, petals white... .. 2. *B. adiantoides*.

1. BIOPHYTUM SENSITIVUM, DC. Prod. I, 690. Stem 4 to 10 in. long, hispidulous, erect or decumbent, bearing at its apex 8 to 20 pinnate leaves 1.5 to 5 in. long; leaflets 6 to 15 pairs, the lower pairs oblong, the upper pair obovate-oblong, the apices of all obtuse, sometimes mucronate, the bases truncate, subequal, glabrous, .25 to .5 in. long. *Peduncles* variable in length, sometimes nearly as long as the leaves, puberulous, each bearing at its apex a bracteolate umbel of 10 or 12 flowers; bracteoles setaceous, as long as the flower pedicels, pedicels pubescent, as long as the sepals. *Petals* yellow. Hook. fil. Fl. Br. Ind. I, 436; Roxb. Fl. Ind. II, 457; W. and A. Prod. 162; Bot. Reg. XXXI, t. 68; Wall. Cat. 4343 C. E.

Malacca: Griffith. Penang, on the coast, Curtis; and probably in the other provinces.

2. BIOPHYTUM ADIANTOIDES, Wight ex Hook. fil. Fl. Br. Ind. I, 437. Stem from 6 to 12 in. high, erect or decumbent, pubescent, bearing at its apex 10 or 12 pinnate leaves 4 to 7 in. long; leaflets 18 to 25 pairs, oblong, obtuse, unequal-sided, the apex mucronate, the base obliquely truncate, sometimes auriculed at the upper margin, sparsely strigose on the upper surface. *Peduncles* more than half as long as the leaves, pubescent, each bearing at its apex a densely bracteolate umbel of 6 to 12 flowers; bracteoles short, setaceous: flower-pedicels slender, puberulous, longer than the sepals. *Petals* white, the claws yellow.

Perak: on the banks of the Kamha river, King's collector, No. 931; on the Plus river, Wray No. 3363. Goping, Scortechini, No. 1999. **DISTRIB.** Burmah.

3. CONNAROPSIS, Planch.

Trees or shrubs. *Leaves* pinnately 1-3-foliolate; leaflets coriaceous, quite entire, strongly nerved, triple-nerved at the base, margined. *Flowers* minute, regular, in terminal and axillary paniced cymes. *Sepals* 5, imbricate, connate at the base. *Petals* 5, imbricate. *Glands* 0. *Stamens* 10, filaments united at the base, the alternate shorter. *Ovary* 5-angled, 5-celled; styles 5, subulate, more or less united below, stigmas apiculate; ovules 2 in each cell. *Fruit* fleshy, 5-lobed or 5-angled with succulent epicarp and fibrous endocarp, 1- or 2-celled and 1- or 2-seeded by abortion, indehiscent. **DISTRIB.** Five species, all Malayan.

Leaves 3-foliolate 1. *C. Griffithii*.

Leaves 1-foliolate.

Leaves 2 to 3·5 in. long 2. *C. monophylla*.

Do. 6 to 12 in. long 3. *C. macrophylla*.

1. CONNAROPSIS GRIFFITHII, Planch. in Hook. fil. Fl. Br. Ind. 440.

A small tree; young shoots glabrescent, dark-coloured when dry. *Leaves* pinnately trifoliolate, coriaceous, glabrous; leaflets elliptic-lanceolate, acuminate, the base cuneate; main nerves 4 pairs, ascending: length 2 to 3·5 in., breadth ·5 to 1 in., petiolule ·15 in. *Panicles* terminal, minutely ferruginous-tomentose, 1·5 to 2 in. long. *Fruit* unknown.

Malacca: Griffith, No. 1667. Maingay (Kew Distrib.), No. 274.

2. CONNAROPSIS MONOPHYLLA, Planch. Hook. fil. Fl. Br. Ind. I., 440.

A shrub or small tree; young shoots minutely ferruginous-pubescent. *Leaves* 1-foliolate, coriaceous, glabrous, ovate, acuminate, the base rounded or sub-cuneate: main nerves about 6 pairs, faint; length 2 to 3·5 in., breadth ·8 to 1·5 in.; petiole ·6 to ·8 in., thickened and pointed towards the apex. *Panicles* terminal or lateral, 2 to 4 in. long, ferruginous-tomentose; the branches erect and spike-like; flowers

crowded. *Fruit* ovoid, glabrous, obtusely 5-angled and furrowed, .3 in. long; endocarp fibrous, sarcocarp fleshy.

Malacca; Griffith No. 947; Maingay (Kew Distrib.) as 273. Perak, Scortechini, King's collector, Wray.

3. *CONNAROPSIS MACROPHYLLA*, King n. sp. A shrub or small tree: young branches glabrescent or glabrous. *Leaves* 1-foliolate, coriaceous, glabrous, oblong, acute or shortly acuminate, scarcely narrowed to the rounded sub-truncate or sub-emarginate base; main nerves 8 or 9 pairs, spreading, the reticulations distinct beneath: length 6 to 12 in., breadth 2.35 to 3.65 in.; petiole .5 in., jointed above the middle. *Flowers* in two or three terminal or lateral spikes which are sometimes united to form a kind of panicle. *Spikes* glabrescent, 2 or 3 in. long. *Flowers* crowded. *Fruit* ovoid, apiculate, glabrous, about .3 in. long.

Perak: King's collector, Nos. 433, 3124; Ridley No. 3087. Province Wellesley; Curtis No. 474.

4. *DAPANIA*, Korthals.

Woody climbers. *Leaves* alternate, simple, coriaceous, entire, the petiole jointed about the middle. *Flowers* small, regular, sometimes unisexual, in slender spike-like racemes which are solitary, or in fascicles, axillary or from tubercles on the stem. *Sepals* 5, connate at the base, imbricate. *Petals* 5, hypogynous, imbricate, longer than the sepals. *Stamens* 10, the alternate 5 shorter, all united at the base into a shallow tube. *Ovary* deeply 5-lobed, 5-celled, each cell usually with 1 (sometimes with 2) pendulous ovule from an axile placenta. *Fruit* clavate, the calyx persistent but not enlarged, deeply 5-lobed, the epicarp slightly fleshy, the endocarp fibrous, 5-celled, 5-seeded, dehiscing loculicidally so as to form a five-rayed fibrous star with a seed attached to the central ridge (placenta) of each segment. **DIS-TRIB.** About 4 species; all Malayan.

1. *DAPANIA SCANDENS*, Stapf in Hook. Ic. Pl., t. 1997. A glabrous climber 50 to 100 feet long. *Leaves* ovate-elliptic, acuminate, the base rounded; main nerves 4 or 5 pairs, ascending, faint, length 3 to 5 in., breadth 1.25 to 2 in.; petiole .25 to .35 in., jointed about the middle. *Racemes* slender, puberulous, about 1.5 to 2.5 in. long. *Flowers* some hermaphrodite and some with stamens only, .1 to .15 in. long, each with a minute ovate bracteole at the base of its short pedicel. *Calyx-lobes* obtuse, ciliate. *Petals* oblong, ob-lanceolate, twice as long as the calyx. *Fruit* 3 in. long, dehiscing into a flat star-shaped mass 4 in. in diam. *Connaropsis dioica*, Scortechini MSS. in Herb. Calcutta.

Perak: Curtis. Scortechini, Wray, King's collector.

By far the majority of the flowers have stamens only, the pistils

being either quite rudimentary or absent: these male flowers are about half as long again as the hermaphrodites. The genus *Dapania* was founded by Korthals to receive the Sumatran plant which that author called *D. racemosa*. Of this, there is an authentic specimen in the Calcutta Herbarium; but unfortunately it has neither flowers nor fruit. Amongst Forbes' plants collected in Sumatra, No. 1217 agrees so perfectly with Korthal's *D. racemosa* in foliage, as to leave no doubt that it belongs to the same species; and on Forbes' specimens there are ripe fruits. These ripe fruits, as well as its leaves, show *D. racemosa* to be quite distinct from *D. scandens*, Stapf, the leaves being thinner in texture, and the fruits longer than those of *D. scandens*. The seeds of Forbes' specimens do not, however, show the curious aril (lacinate and almost 2-lipped) which Korthals describes: and, as the seeds of *D. scandens* show no trace of an aril, I agree with Dr. Stapf that Korthals probably described the existence of an aril as the result of some confusion. The majority of the ovaries dissected by me have only a single ovule: in one or two cases, however, a second (as figured by Dr. Stapf) has been found. In no case, however, have I found two seeds in a loculus of the fruit. There is no doubt that, as Dr. Stapf points out, the genus *Connaropsis* comes very near *Dapania*; and it may become desirable, as both genera became better known, to reduce *Connaropsis* (which dates only from 1862) to *Dapania* which was published in 1854. In the meantime the fruit of *Connaropsis* is not properly known, and there is no evidence that it is dehiscent. The fruit of *C. monophylla* is very like that of *Dapania scandens*, but no specimens that I have seen show any sign of dehiscence; while that of *C. macrophylla* is but little angled externally and the appearance of all the specimens I have seen is suggestive of indehiscence. Moreover, all the species of *Dapania* appear to be scandent; while all those of *Connaropsis* are shrubby or arboreous. Concerning the structure of the seeds I can say nothing, not having met with good seeds of either. The two genera remain at present separated chiefly by these two points of difference, *viz.*, dehiscence of the fruit and habit. Whether others may be found remains to be seen when better materials shall be obtained.

Beccari's specimen (P. S. 900) appears to belong to a species slightly different from either *D. scandens* or *D. racemosa*. And, as I understand from Dr. Stapf, the same Collector's No. 2951, from Borneo (which I have not myself examined), belongs to still another species.

5. IMPATIENS, Linn.

Herbs, rarely shrubby at the base. *Leaves* opposite or alternate, in some whorled, in others all radical, simple, exstipulate, or with

stipular glands at the base of the petiole. *Flowers* in scapes, or in axillary or terminal 1-2 or many-flowered peduncles, irregular, resupinate. *Sepals* 3, rarely 5, imbricate; 2 anterior when present minute; 2 lateral small, flat, usually green; posterior (anterior in flower) large, petaloid, produced into a hollow spur or sac. *Petals* 3 (or 5); anterior (outer in bud) large; lateral 2-lobed (or 2 connate). *Stamens* 5, filaments short, broad; anthers cohering. *Disc* 0. *Ovary* oblong, 5-celled; stigma sessile, 5-toothed; ovules many, 1-seriate in each cell. *Capsule* loculicidal; valves 5, elastically springing away from a placentiferous axis. *Seeds* smooth or tubercled, glabrous or hairy, albumen 0; embryo straight.—**DISTRIB.** Mountainous parts of Trop. Asia and Africa, rare in Temp. Europe, N. America, N. Asia, and S. Africa; species about 200.

Flowers yellow: stem fleshy, several feet high

and more than a foot in diam. at the base ... 1. *I. mirabilis*.

Flowers lilac, purple or white: stems herbaceous, slender.

Leaves linear-lanceolate, the upper

whorled, the lower in pairs, opposite... 2. *I. Griffithii*.

Leaves linear-oblong to obovate or rotund, all opposite ...

... 3. *I. chinensis*.

1. *IMPATIENS MIRABILIS*, Hook. fil. in Curtis's Bot. Mag., t. 7195.

Stem fleshy, cylindric, 3 to 5 feet high and 18 to 20 in. in diam. at the base, branched above. *Leaves* thinly fleshy, crowded at the ends of the branches, much narrowed to the base, obovate to ovate, crenate, with a thick fleshy midrib and 13 or 14 pairs of faint pinnate nerves, both surfaces glabrescent: length 5 to 7 in., breadth 3.5 to 4.5 in., petiole 1 to 1.5 in. *Racemes* axillary, as long as, or longer than the leaves, slender, and few-flowered. *Flowers* yellow, 1.75 in. long, sepals 3; the lateral elliptic-oblong, acute; the posterior widely hemispheric with a short incurved spur; anterior petal rotund, transversely oblong, the lateral petals united into a single 3-lobed piece.

Langkani: Curtis No. 1678.

The above description of this very remarkable species is chiefly copied from Sir Joseph Hooker.

2. *IMPATIENS GRIFFITHII*, Hook. fil. and Thoms. in Journ. Linn. Soc. IV, 120: Fl. Br. Ind. I, 445. Herbaceous; stem a foot or more in height, erect, terete, sparsely puberulous. *Leaves* linear-lanceolate, much narrowed towards the base, those in the lower part of the stem in pairs, opposite and petiolate; those in the upper part narrower, in whorls of three and sessile; all remotely serrate-toothed, 1.5 to 4 in. long; the texture rather thick, the lower surface pale and glabrous, the upper sparsely hairy. *Pedicels* solitary, rarely paired, slender,

1 in. or more in length. *Flowers* 1 in. in diam., flattish, rose-lilac. *Sepals* ovate-oblong, acuminate: standard broadly obcordate with a filiform spur behind, the wings broadly bi-lobed. *Capsule* elliptic, turgid in the middle.

Malacca: on Mount Ophir, Gerai, &c.; Griffith, Maingay.

3. *IMPATIENS CHINENSIS*, Linn. Herbaceous: stem 4 to 18 in. long, suberect, decumbent and rooting at the base, angled. *Leaves* subsessile, varying from linear-oblong to obovate or almost rotund, acute or obtuse, sharply serrate, always opposite, the base acute or rounded, often auricled; texture rather thick, glaucous beneath, glabrous or sparsely hairy, .5 to 4 in. long: stipules setaceous, glandular, recurved. *Flowers* .5 to 1 in. in diam., flattish, purple, or white. *Pedicels* solitary or fascicled, sometimes longer than the leaves. *Sepals* linear: standard orbicular, the wings semi-obovate, entire, auricled at the base; spur slender, long, incurved. *Capsule* .5 to .75 in. long, elliptic, turgid in the middle.

Malacca; Griffith. **DISTRIB.** China, British India.

6. *HYDROCERA*, Blume.

A glabrous erect marsh herb. *Leaves* narrow, alternate. *Flowers* in short axillary 1-2-flowered peduncles, irregular. *Sepals* 5, coloured, imbricate; 2 outer lateral, flat; posticous one produced into a short hollow spur. *Petals* 5, the anticus outer, very large, concave. *Disc-glands* 0. *Stamens* 5; filaments short, flat; anthers slightly cohering around the pistil. *Ovary* 5-celled; stigmas 5, sessile; ovules 2-3 in each cell. *Drupe* baccate, endocarp bony, truncate, 5-celled, cells 1-seeded. *Seeds* curved, corrugated, albumen 0; cotyledons plano-convex, thickish, radicle short, superior.—**DISTRIB.** One tropical Asiatic species.

1. *HYDROCERA TRIFLORA*, W. & A. Prod. I, 140. Annual; the stem often floating, fistular, often flexuose and rooting at the nodes; branches erect, 1 to 2 feet long, 5-angled. *Leaves* linear-lanceolate, serrate, attenuated into a petiole at the base, stipulate, glands two. *Flowers* 1 in. in diam., red white and yellow. *Drupe* globose, .75 in. in diam., smooth, red, when dry 5-angled and truncate. Hook. fil. Fl. Br. Ind. I, 483; Miq. Fl. Ind. Bat. I, Pt. 2, 132; H. f. & T. in Journ. Linn. Soc. iv. 156. *H. angustifolia*, Blume Bijd. 241. *Impatiens triflora*, Linn. DC. Prodr. i. 687; Wall. Cat. 4756. *I. ? natans*, Willd.; DC. Prodr. i. 687; Roxb. Fl. Ind. i, 652; Wall. Cat. 4755. *Tytonia natans*, G. Don, Gen. Syst. i. 749. *Balsamina angustifolia*, Burm. Thes. Zeyl. t. 16 fig. 2 (*inaccurate*).

In all the Provinces except the Andaman and Nicobar Islands. **DISTRIB.** Malayan Archipelago, British India, Ceylon.

ORDER XXIII. RUTACEÆ.

Trees or shrubs, rarely herbs, abounding in pellucid glands filled with essential oil. *Leaves* opposite or alternate, simple or compound, exstipulate. *Flowers* in axillary or terminal cymes or panicles, never spiked, usually bisexual and regular in the Indian species. *Calyx* of 4-5 small lobes or sepals. *Petals* 4-5, hypogynous (in the Indian genera), valvate or imbricate. *Stamens* 4-5 or 8 or 10, rarely more (*Citrus*, *Ægle*); filaments usually free, hypogynous; anthers 2-celled, opening inwards. *Disc* within the stamens, crenate or lobed, sometimes large or long. *Ovary* of 4-5 free or connate carpels; styles as many, free or variously united; stigmas terminal, entire or lobed; ovules usually 2 in each cell. *Fruit* a capsule, berry or drupe, or 1-4 capsular cocci. *Seeds* usually solitary in the cells, testa various, albumen fleshy or 0; embryo straight or curved, radicle superior.—
DISTRIB. Tropical and extratropical. Genera 83, and about 70 species.

Ripe fruit separating into dehiscent cocci or follicles.

Flowers generally unisexual; disc free or absent; ovaries partially united; styles basilar or ventral, free at the base; cells 2-ovuled.

Leaves opposite.

- | | | | |
|---|-----|-----|-------------------------|
| Stamens 4 or 5 | ... | ... | 1. <i>Evodia</i> . |
| Stamens 8, four perfect opposite the sepals, alternating with four imperfect opposite the petals... | | | 2. <i>Tetractomia</i> . |
| Stamens 8, all perfect | ... | ... | 3. <i>Melicope</i> . |
| Leaves alternate, stamens 3 to 5 | ... | ... | 4. <i>Zanthoxylum</i> . |

Ripe fruit indehiscent.

Flowers polygamous: petals 4, stamens 8; disc free: ovaries and styles 4, united, the cells 2-ovuled; fruit syncarpous, 4-celled, indehiscent, seed albuminous; leaves 1-foliolate 5. *Acronychia*.

Flowers hermaphrodite, petals and stamens free or connate, ovaries and styles completely united, cells 1-to many-ovuled: fruit a berry, sometimes with but little pulp, seed exalbuminous

Unarmed.

- | | | | |
|--|-----|-----|-----------------------|
| Style short, persistent; leaves 1 to 5-foliolate | ... | ... | 6. <i>Glycosmis</i> . |
|--|-----|-----|-----------------------|

- Style deciduous, leaves pinnate.
 Cotyledons leafy, crumpled ;
 petals valvate ; filaments
 linear-subulate, not dilated
 at the base 7. *Micromelum.*
- Cotyledons fleshy, plano-con-
 vex, petals imbricate.
 Filaments not dilated at
 the base... .. 8. *Murraya,*
 Filaments dilated at the
 base 9. *Clausena.*
- Armed ; leaves 3-to 8-foliolate.
 Calyx 3-lobed, petals 3, stamens 6 10. *Triphasia.*
 Calyx cup-shaped, entire or obs-
 curely lobed : petals 4, stamens
 8 to 10 11. *Luwunga.*
- Armed or unarmed ; leaves 1-foliolate.
 Anthers linear-oblong, disc cylin-
 dric forming a gynophore ... 12. *Paramignya.*
 Anthers ovate-oblong, sometimes
 cordate, the filaments free or
 conjoined into a tube ; disc
 cupular 13. *Atalantia.*

1. *EVODIA*, Forst.

Trees or shrubs, unarmed. *Leaves* opposite, simple or 1-3-foliolate or imparipinnate, quite entire. *Flowers* small, in paniced axillary cymes, unisexual. *Sepals* 4-5, imbricate. *Petals* 4-5, sessile, valvate or slightly imbricate. *Stamens* 4-5, inserted at the base of the disc, filaments subulate, anthers oblong. *Ovary* deeply 4-lobed, 4-celled ; style basilar, stigma 4-lobed, ovules 2 in each cell, collateral or superposed. *Fruit* of 2 to 4 coriaceous 1 to 2-seeded cocci ; endocarp horny, elastic. *Seeds* oblong or globular, testa bony or crustaceous, shining ; hilum linear, albumen fleshy ; embryo straight, cotyledons ovate.—
 DISTRIB. About 25 species, natives of tropical Asia, the Pacific, the E. African Islands, and Australia.

Leaves 3-foliolate.

Leaflets usually more or less obovate :
 cymes broad pyramidal or corymbose,
 much branched.

Lower surface of leaflets pubescent... 1. *E. latifolia.*

Lower surface of leaves glabrous.

Apices of leaflets acuminate or apiculate, main nerves rather faint, sub-horizontal or slightly ascending; cymes pyramidal... 2. *E. Roxburghiana.*

Apices of leaflets shortly and abruptly acuminate, main nerves rather faint, sub-horizontal or ascending, cymes corymbose ... 3. *E. glabra.*

Apices of leaflets obtuse, nerves very prominent beneath, cymes corymbose ... 4. *E. robusta.*

Leaflets oblong or elliptic-oblong, not at all obovate, tapering little to the ends: ripe cocci 4 in. long ... 5. *E. macrocarpa.*

Leaflets oblong-elliptic, tapering to each end: cymes few-branched, very tomentose: flowers in globular masses ... 6. *E. pilulifera.*

Leaflets oval to elliptic, obtuse or sub-acute, very coriaceous, the edges revolute when dry: cymes small, flowers 25 in. long ... 7. *E. pachyphylla.*

Leaves 1-foliolate ... 8. *E. pedunculosa.*

1. *EVODIA LATIFOLIA*, DC. Prod. I., 724. A tree 15 to 20 feet high: young branches stout, obscurely 4-angled, flattened at the nodes, rusty or tawny-puberulous. *Leaves* 3-foliolate, membranous, the petiole 4 to 6 in. long, usually angled, puberulous; leaflets obovate-elliptic to elliptic, acute or shortly acuminate, the base cuneate; main nerves 13 to 18 pairs, spreading, curving, prominent beneath; upper surface glabrescent or glabrous except the tomentose midrib and nerves, the lower softly pubescent, sometimes becoming glabrescent when old; length 5 to 9 in., breadth 2.5 to 4.5 in. (the middle one usually the largest); petiole 2 to 4 in. *Cymes* axillary, broad, with opposite spreading rusty-tomentose branches on stoutish puberulous peduncles 1 to 2 in. long. *Flowers* less than 1 in. long, densely crowded; sepals sub-acute, pubescent outside; petals glabrous except a few hairs on the back outside; ovary villous. *Cocci* 2 or 3 from each flower, broadly ovate, blunt, sub-glabrous, 1-2-seeded: seed black. Hook. fil. Fl. Br. Ind. I., 489; Miq. Fl. Ind. Bat. i. pt. 2, 672; Ann. Mus. Lugd. Bat. iii, 244. *Zanthoxylum Eumphanum*, Cham. in Linnæa v. 58.

In all the provinces, except the Andamans and Nicobars: **DISTRIB.** Malayan Archipelago.

In its flowers and fruit this closely resembles *E. Roxburghiana*, Benth., but the leaves are different.

2. *EVODIA ROXBURGHIANA*, Benth. *Flora of Hong-Kong*, 59. A small tree; branches glabrous, opposite. *Leaves* glabrous, 3-foliolate, the petiole 2 to 5 in. long, terete; leaflets thinly coriaceous, shortly petiolulate, obovate, oblanceolate or oblong, the apex rounded acuminate or apiculate: main nerves 12 to 18 pairs, horizontal or slightly ascending, not prominent; length 2·5 to 6 in., breadth 1·25 to 3·25 in., the middle leaflet the largest; petiolule ·15 to ·25 in. *Cymes* pedunculate, spreading; the branches opposite, minutely bracteolate at the base: peduncles 2 to 3 in. long: cymes about 2·5 to 3 in. in diam. *Flowers* densely crowded, whitish, ·1 to ·15 in. long; the anthers exerted, shortly pedicelled, sepals very obtuse, ovary pubescent. *Cocci* about 2 from each flower, ovoid, pointed, 1-to 2-seeded, ·2 to ·3 in. long. *Seeds* black, shining. Hook. fil. *Fl. Br. Ind.* I, 487; Kurz *Fl. Burm.* I, 180. *E. triphylla*, Bedd. *Flor. Sylvat.*; *Anal. Gen.* xli. t. vi. f. 2. *E. Marambong*, Miquel *Ann. Mus. Bot.* iii. 244. *Fagara triphylla*, Roxb. *Fl. Ind.* i. 416 (? of Linn.). *F. Lunur-ankenda*, Gærtner. *Carp.* i., 334, t. 68. f. 9. *Xanthoxylon triphyllum*, Wight *Ic. t.* 204; *Ill.* i. 169; *Grah. Cat. Bomb. Pl.* 36; *Dalz. & Gibs. Bomb. Flor.* 45. *X. Roxburghianum*, Cham. in *Linnæa* v. 58. *X. zeylanicum*, DC. *Prodr.* i., 728. *X. nilagiricum*, Miquel *Herb. Hohenack.*

In all the Provinces: common. *DISTRIB.* Malayan Archipelago, British India.

A widely distributed species very common in most parts of the Malayan Peninsula, and varying a good deal in the size of the leaves and in the degree of density of the cymes. In some cases the latter are lax and open, but in the majority they are condensed. There is some doubt as to what name this plant should bear. Sir Joseph Hooker (*F. B. I. l. c.*) has written an excellent note on its synonymy which should be consulted. The species, except in the matter of size, differs very little from *E. triphylla*. DC.

3. *EVODIA GLABRA*, Blume *Bijdr.* 245. A tree 40 to 70 feet high: young branches stout, compressed at the nodes, glabrous. *Leaves* 3-foliolate; the petioles 2 to 4 in. long, glabrous, terete, grooved in front towards the apex: leaflets more or less coriaceous, shortly petiolulate, obovate or obovate-elliptic, shortly and abruptly acuminate, rarely obtuse, always tapering much to the base, upper surface shining, the lower glabrous or puberulous: main nerves 10 to 15 pairs, oblique or sub-horizontal, prominent on the lower surface and often depressed on the upper when dry; length 4 to 10 in., breadth 2·25 to 5 in., petiolule ·2 to ·4 in., the middle leaflet the largest and with the longest petiolule.

Cymes pedunculate, corymbose, the main branches ascending, the secondary spreading, all opposite, minutely bracteolate at the base, puberulous or almost glabrous; peduncles stout, compressed, glabrescent, 1·5 to 4 in. long. *Flowers* 1 in. long (excluding the exerted stamens) densely crowded, many of them practically unisexual, the ovary being abortive. *Sepals* sub-orbicular, obtuse, puberulous. *Petals* glabrous. *Stamens* exerted. *Ovary* depressed, glabrous, or hairy at the base of the styles. *Cocci* 2 or 3 to each flower, 2 in. long, rugulose and glandular externally, broadly ovate, obtuse. *Seeds* black. Miq. Fl. Ind. Bat. I, Pt. 2, 672; Ann. Mus. Lugd. Bat. III, 243; Hook. fil. Fl. Br. Ind. I, 489.

Perak: very common. Penang, Curtis, No. 2485. Andaman Islands, King's collectors. Nicobars, Kurz.

This is best distinguished from *E. Roxburghiana* and *E. latifolia* by its more coriaceous leaves with stronger nerves, and by its more corymbose cymes. The flowers, however, are very little different in all three, and it seems doubtful whether it would not be better to treat all as forms of a single widely distributed and variable species.

4. *EVODIA ROBUSTA*, Hook. fil. Fl. Br. Ind. I., 488. A small tree; young branches as thick as a swan's quill, compressed, hoary. *Leaves* 3-foliolate, the petiole 4 in. long, terete, as thick as a crowquill: leaflets coriaceous, elliptic, the terminal sub-obovate, obtuse or obtusely acuminate, the midrib and arching nerves very strong, glabrous except the puberulous midrib beneath, the upper surface shining; length 6 to 8 in. *Cymes* broad, (5 in. in diam.), brachiate, their branches very robust. *Flowers* and fruit as in *E. Roxburghiana*.

Penang; Phillips. Singapore; Maingay (Kew Distrib.) No. 278.

This species must come very near *E. glabra*, Bl. It also greatly resembles the Sumatran *E. euneuron*, Miq. (Fl. Ind. Bat. Suppl. 532).

5. *EVODIA MACROCARPA*, King, n. sp. A tree 20 to 40 feet high: young branches rather stout, cinereous-puberulous, compressed. *Leaves* 3-foliolate, the petiole 3 to 4 in. long, glabrous: leaflets coriaceous, oblong, or elliptic-oblong, acute, narrowed to the slightly unequal-sided base; both surfaces glabrous, the upper shining, the lower dull and paler when dry; main nerves 14 to 18 pairs, almost horizontal, faint; length 6 to 12 in., breadth 2 to 3 in., petiole 1 to 2 in.; the middle leaflet the largest. *Cymes* axillary, pyramidal, shortly pedunculate, olivaceous-tomentose; the branches opposite, spreading, bracteolate at the base; peduncles 5 to 1·5 in. long, puberulous. *Flowers* 1 in. long, densely crowded, many of them with perfect stamens but an abortive ovary; sepals triangular, acute, pubescent; petals puberulous. *Stamens* exerted. *Ovary* villous. *Cocci* 3 or 4 to each flower, compressed, obovate, blunt, 4 in. long, dark-coloured and

puberulous externally, lined inside with dense white hairs: seeds 2, black, shining.

Perak: Wray, No. 2618 and 3266; King's collector, No. 7489.

A very distinct species, recognisable at once by its long and comparatively large leaflets, small cymes, and large cocci.

6. *EVODIA PILULIFERA*, King n. sp. A shrub 10 to 15 feet high: young branches rather slender, flattened at the nodes, minutely tawny-tomentose, the bark pale. *Leaves* 3-foliolate, the petiole 3 to 4.25 in. long, terete, grooved in front, deciduously tawny-tomentose; leaflets thinly coriaceous, petiolulate, oblong-elliptic, tapering to each end, the apex shortly acuminate, the base very narrow; both surfaces glabrous, the lower paler when dry: main nerves 9 or 10 pairs, oblique, interarching boldly well within the edge, prominent on the lower, depressed on the upper surface when dry; length 3.5 to 8 in.; breadth 1.25 to 2.75 in.; petiolule .15 to .4 in., the middle leaflet rather larger than the lateral. *Cymes* everywhere tawny-tomentose, axillary, on long peduncles; the branches few, opposite, each bearing towards the apex a few dense sub-globose masses of flowers. *Flowers* less than .1 in. long. *Sepals* ovate, acute, densely tawny-tomentose. *Petals* glabrous. *Ovary* villous. *Cocci* slightly compressed, ovoid, blunt, minutely tawny-tomentose outside, the interior glabrous, .2 in. long. *Seed* solitary, shining.

Perak: Scortechini, No. 360; Wray, No. 2995; King's collector, No. 6275.

This species is readily distinguished by its minutely tomentose few-branched cymes, each bearing a few densely crowded heads of small flowers.

7. *EVODIA PACHYPHYLLA*, King n. sp. A small tree 10 to 15 feet high; young branches flattened at the nodes, minutely rufous-tomentose, as are the petiole, under surfaces of the midribs and peduncles of the cymes. *Leaves* 3-foliolate, the petiole 2.5 to 3 in. long: leaflets very coriaceous, oval to elliptic, obtuse or sub-acute, the base slightly cuneate, the edges revolute when dry; upper surface glabrous, shining, the lower pale, glaucous; main nerves 8 to 12 pairs, sub-horizontal, curving slightly, interarching within the edge, slightly prominent on the lower surface when dry, the midrib very bold; length 2.25 to 3.75 in., breadth 1.2 to 2.25 in., petiolule .35 to .5 in. *Cymes* axillary, pedunculate, the branches few, short, close together; peduncles 1 to 1.5 in. long. *Flowers* .25 in. long, in dense sub-globular masses. *Sepals* broadly ovate, acute, olivaceous-tomentose externally, glabrous internally. *Petals* erect, ovate-lanceolate, pubescent on both surfaces, the edges glabrous. *Stamens* not exerted. *Ovary* glabrous. *Cocci* 2 or 3 from each flower, sub-compressed, ovate, blunt, pale and puberulous externally, glabrous within. *Seed* solitary, black, shining.

A very distinct species, at once distinguishable by its small coriaceous leaflets and large flowers and fruits.

8. *EVODIA PEDUNCULOSA*, Hook. fil. Fl. Br. Ind. I, 489. A small tree? young branches cylindric, smooth. *Leaves* 1-foliolate; petiole rather stout, half-cylindric, .5 to 1 in. long. *Leaflets* coriaceous, obovate, abruptly narrowed at the obtuse apex, the base cuneate: both surfaces glabrous, minutely reticulate, main nerves numerous, slender, spreading, length 4 to 5 in. *Cymes* pedunculate, pubescent, branching near the apex into small trichotomous pubescent cymules; peduncles 1 to 4 in. long. *Flowers* (buds only seen) .1 in. long, shortly pedicelled. *Sepals* rounded. *Petals* broadly ovate, acute, glabrous. *Ovary* 4-cleft, immersed in the disc.

Singapore; Lobb.

Known only from Lobb's solitary and imperfect specimen.

2. *TETRACOMIA*, Hook. f.

Trees or shrubs. *Leaves* opposite, petioled, 1-foliolate, coriaceous, quite entire, punctate. *Flowers* small, in axillary branched cymes. *Calyx* small, 4-partite. *Petals* 4, triangular-ovate, acute, persistent, valvate. *Disc* broad, glandular, flattish or pulvinate, obtusely 4-angled. *Stamens* 4 or 8, (4 perfect alternate with the petals, 4 smaller with imperfect anthers opposite the petals and partially adnate to them at the base); filaments subulate, flattened at the base; anthers 2-lobed, dorsifixed. *Ovary* immersed in the centre of the disc, 4-celled, with 4 free projecting lobes; styles 4, free at the base, connate above; stigma capitate, obscurely 4-lobed; ovules 2, collateral in each cell. *Fruit* of 4 coriaceous, laterally compressed, oblong, 2-seeded cocci, splitting ventrally, the horny endocarp partially separating. *Seeds* inserted towards the base of the carpels.—*DISTRIB.* Three species, natives of the Malayan Peninsula and Borneo.

Leaves elliptic-obovate, 6 to 9 in. long;

flowers .25 in. long: ripe cocci .5 in. long ... 1 *T. majus*.

Leaves usually cuneate-obovate, rarely elliptic-obovate, 2.5 to 5 in. long; flowers 1.3 in.

long; ripe cocci .25 in. long 2 *T. Roxburghii*.

1. *TETRACOMIA MAJUS*, Hook. fil. Fl. Br. Ind. I. 491. A tree; young branches stout; their bark brown, rough. *Leaves* very coriaceous, obovate, elliptic, obtuse, narrowed to the base; both surfaces glabrous, very pale when dry: main nerves 12 to 16 pairs, rather straight, oblique, interarching far from the margin, slightly prominent or both surfaces when dry; length 6 to 9 in., breadth 3 to 4 in., petiole 2 to 2.25 in., stout, terete, slightly swollen at base and apex.

Cymes glabrous or glabrescent, 4 to 6 in. in diam., the branches opposite; bracts minute, persistent. *Flowers* .25 in. in diam., glabrous. *Stamens* 4, perfect; the *filaments* longer than the petals and style, the 4 staminodes minute. *Ripe cocci* about .5 in. long, keeled. *Seeds* oblong, the nucleus basal, much smaller than the oblong wing. *Tetramerista paniculata*, Kurz in Journ. Bot for 1875, p. 333.

Malacca; Maingay (Kew Distrib.) No. 290.

A rare plant known only by Maingay's scanty specimens.

2. TETRACOTOMA ROXBURGHII, Hook. fil. Fl. Br. Ind. I., 491. A tree 30 to 80 feet high; young branches rather stout, glabrous, their bark pale, rough. *Leaves* coriaceous, cuneate-obovate, sometimes obovate-elliptic, the apex always broad and rounded, and very shortly and bluntly apiculate, much narrowed to the petiole; both surfaces glabrous, rather pale when dry, the upper glabrous, the lower glabrescent with numerous and rather large black dots: main nerves 7 to 9 pairs, oblique, straight, not prominent: length 2.5 to 5, rarely 6 in., breadth 1.5 to 2.5, rarely 3 in.; petiole .5 to 1 in., rarely 1.25 in. *Cymes* glabrous in the lower, pubescent in the upper part, 3 or 4 in. in diam., pedunculate; bracts minute, persistent. *Flowers* .13 in. in diam., puberulous. *Stamens* 8, the alternate row imperfect, minute and attached to the petals. *Ripe cocci* 1 to 3 from a flower, about .25 in. long. *Seeds* oblong, nucleus rather shorter than the wing, Hook. fil. Icones Plantar. 1512. *Melicope tetrandra*, Roxb. Fl. Ind. II. 257.

Penang, Singapore, Perak.

A much more common plant than the last, with smaller flowers and fruit, and with leaves not only smaller but much more obovate.

3. MELICOPE, Forst.

Shrubs. *Leaves* opposite (in the Indian species), 1-3-foliolate, pellucid-punctate. *Flowers* small, in axillary cymes or panicles. *Calyx* 4-lobed or 4-partite. *Petals* 4, sessile, spreading, valvate or imbricate. *Disc* large, entire or 8-lobed, or obsolete. *Stamens* 8, inserted at the base of the disk, those opposite the petals shorter, filaments subulate or flattened; anthers oblong or cordate. *Ovary* 4-celled, deeply 4-lobed; style basilar, or styles 4, subterminal, more or less combined; stigma capitate, 4-lobed; ovules 2 in each, all collateral or superposed. *Fruit* of 4 free spreading coriaceous cocci, dehiscing on the inner face; endocarp more or less separating from pericarp. *Seeds* oblong, testa black, shining; embryo with large oblong cotyledons and short radicle. **DISTRIB.** chiefly Polynesian: species about 15.

1. MELICOPE HELPERI, Hook. fil. Fl. Br. Ind. I, 492. A glabrous

dicæous shrub : young branches rather stout, striate, sub-quadrangular. *Leaves* 1-foliolate : leaflet coriaceous, obovate-elliptic, very obtuse, narrowed to the base : main nerves about 9 pairs, spreading, inconspicuous ; length 4·5 to 6 in., breadth 2 to 3 in. ; petiole ·75 to 1 in. *Panicles* not much longer than the petioles, few-branched, cymose. *Flowers* ·2 in. in diam. *Calyx-lobes* acute. *Petals* longer than the calyx, lanceolate, acute, puberulous outside, ridged along the midrib on the inner surface inside. Kurz For. Flora Burmah, I, 182.

Andaman Islands ; Helfer (Kew. Distrib.) No. 1192.

4. ZANTHOXYLUM, Linn.

Shrubs or trees, often armed with stout prickles. *Leaves* alternate, 3-foliolate or unequally pinnate ; leaflets opposite or alternate, entire or crenate, often oblique, punctate. *Flowers* small, in axillary or terminal, peduncled, broad or narrow cymes, white, pink, or greenish, often unisexual. *Calyx* 3-8-fid, rarely 0. *Petals* 3-5, rarely 0, imbricate or induplicate-valvate. *Disc* small or obscure. *Stamens* 3-5, hypogynous or reduced to scales in the ♀. *Ovary* rudimentary in the ♂, in the ♀ of 1-5 oblique, 1-celled carpels ; styles sublateral, free or connate above, stigma capitate ; ovules 2 in each cell, usually collateral. *Fruit* of 1-5, globose, coriaceous or fleshy, 1-seeded cocci, dehiscing ventrally ; endocarp horny, separating or not. *Seed* oblong and compressed, or globose, often hanging out of the carpel, hilum broad, testa bony or crustaceous, blue or black, shining, albumen fleshy ; embryo axile, straight or curved ; cotyledons flat, radicle very short.—DISTRIB. About 80 species, all either tropical or subtropical.

Unarmed or very slightly armed : leaves 3-foliolate ; cymes axillary and terminal ; fruit ·3 in. in diam. ... 1. *Z. ovalifolium*.

Armed ; leaves pinnate, leaflets 4 to 9 pairs ; cymes terminal ; fruit ·12 in. in diam. ... 2. *Z. myriacanthum*.

1. ZANTHOXYLUM OVALIFOLIUM, Wight Ill. I, 169. A shrub or tree : young branches at first puberulous but speedily glabrous, lenticellate, unarmed, or with a few short straight prickles. *Leaves* 3-foliolate : petiole 1·25 to 2·5 in., not armed ; leaflets sub-coriaceous, elliptic-oblong, slightly obovate, the apex with an abrupt short obtuse point, the edges crenulate, the base narrowed ; both surfaces shining : main nerves 10 to 14 pairs, sub-horizontal, not much more prominent than the intermediate nerves ; length 2 to 5 in., breadth 1·2 to 2·5 in. ; petiole ·2 to ·4 in., sometimes almost absent ; the middle leaflet larger than the two lateral. *Cymes* slender, paniculate, pedunculate, axillary and terminal, shorter than the leaves, with few alternate branches,

puberulous when young, speedily glabrous. *Flowers* 4- to 5-merous, .12 to .2 in. in diam., pedicellate. *Petals* valvate. *Fruit* solitary, sub-globular, .3 in. in diam., pitted, glabrous. *Seed* sub-globose. Hook. fil. Fl. Br. Ind. I, 492. *Z. undulatum*, Wall. Cat, 1208. *Z. lucidum*, Wall. Cat. 1212. *Toddalia mitis*, Miq. MSS. *Limonia leptostachya*, Jack MSS. Wall. Cat. (without name) 7472 and 7469.

Singapore: Wallich. Andaman Islands, King's collectors. **DISTRIB.**: British India, Sumatra.

2. *ZANTHOXYLUM MYRIACANTHUM*, Wall, Cat. 1214. A glabrous tree 40 feet high, all parts except the petioles armed with short straight prickles. *Leaves* 1 to 1.5 feet long; leaflets 4 to 9 pairs, coriaceous, oblong-lanceolate, acuminate, entire or very obscurely and minutely crenate; main nerves about 8 pairs, spreading, not prominent even when dry; length 3 to 4 in., breadth 1.25 to 1.5 in., petiolule .1 to .2 in. *Cymes* terminal, pedunculate, spreading, 6 to 8 in. in diam.; peduncle armed, 5 or 6 in. long; branches long, sub-opposite or alternate. *Flowers* .2 in. in diam., sub-sessile, 5-merous. *Calyx* with a few small bracts at the base. *Ovaries* 3. *Ripe fruit* compressed, .12 in. in diam., apiculate. *Seed* compressed. Hook. fil. Fl. Br. Ind. I, 496. *Z. longifolium*, Wall. Cat. 7115.

Penang: Porter, Curtis No. 1076. Malacca; Maingay (Kew Distrib.) No. 279.

There are in Scortechini's Herbarium some scraps of a *Zanthoxylum* which appears to be *Z. glandulosum*, Teysm. and Binn.; but without better specimens I hesitate to include that species here.

5. *ACRONYCHIA*, Forst.

Trees, with opposite or alternate, 1-rarely 3-foliolate leaves; leaflets entire. *Flowers* polygamous, small or moderately sized, yellow, in pedunculate, terminal, or axillary corymbs. *Petals* 4, valvate, spreading, revolute. *Stamens* 8, inserted under a thick, 8-angled, tomentose disc; filaments subulate, the alternate longer. *Ovary* inserted in the hollowed apex of the disc, tomentose, 4-celled. *Style* terminal; stigma 4-grooved; ovules 2 in each cell, superposed. *Fruit* a 4-celled drupe, or 4-valved loculicidal capsule. *Seeds* with black testa and copious albumen; embryo straight; cotyledons flat, oblong. **DISTRIB.** About 15 species: all tropical Asiatic or Australasian.

Flowers .35 to .75 in. in diam., linear in bud,

filaments villous, inflorescence cymose ... 1. *A. laurifolia*.

Flowers .15 in. in diam., globular in bud,

filaments glabrous, inflorescence racemose ... 2. *A. Porteri*.

1. *ACRONYCHIA LAURIFOLIA*, Blume Bijdr. 245. A small tree or

shrub; young branches puberulous, speedily becoming glabrous. *Leaves* sub-opposite, 1-foliolate; leaflet thinly coriaceous, oblong, elliptic or sub-obovate, obtusely acuminate or obtuse, the base much narrowed; both surfaces glabrous, shining, reticulate: main nerves little more prominent than the secondary, 14 to 18 pairs, forming a double series of loops within the edge; length 2 to 6 in., breadth 1·1 to 2·4 in., petiole ·5 to ·75 in. *Cymes* axillary, slender, long-peduncled, corymbose, the branches opposite, bracts and bracteoles minute. *Flowers* linear in bud, when open ·35 to ·75 in. in diam., pale yellow. *Sepals* small, semi-orbicular, short. *Petals* linear-oblong, obtuse, widening at the base, revolute, more or less villous on the inner surface. *Filaments* villous below. *Ovary* villous, style short, stigma capitate. *Drupe* sub-globular to ovoid, with an angular apiculus, sometimes narrowed at the base and occasionally lobed, 4-angled when dry, from ·25 to ·4 in. long, 3- or 4-celled. Hook. fil. Fl. Br. Ind. I, 498; Miq. Fl. Ind. Bat. I, pt. 2, 668; Kurz For. Flora Burmah, I, 184. *A pedunculata*, Miq. Fl. Ind. Bat. Suppl. 532; Ann. Mus. Lugd. Bat. III, 245; Thwaites Enum. Pl. Ceyl. 409. *Cyminosma pedunculata* DC. Prod. I., 722; Thwaites Enum. Pl. Ceyl. 69; Wall. Cat. 1205. W. & A. Prod. 147; Wight Ill. I, 165, t. 65; Dalz. & Gibs. Fl. Bombay, Suppl. 17. *C. Ankenda*, Gært. Fruct. I, 280, t. 58. *Clausena simplicifolia*, Dalz. in Kew Journ. Bot. III, 180. *Jambolifera pedunculata*, Vahl Symb. III, 52, fig. 61. *Gela lanceolata*, Lour. Fl. Coch. I, 232. *Selas lanceolatum*, Spreng. Syst. II, 216. *Ximania? lanceolata*, DC. Prod. I, 533. Wall Cat. *indeterm.* 9028.

In the Andaman and Nicobar Islands. **DISTRIB.** British India and Ceylon, Malayan Archipelago, Cochin China.

A widely distributed and variable species, of which Sir Joseph Hooker (Fl. Br. Ind. I, 498) recognises six varieties. Of these, however, only two occur in the Malayan Peninsula, the only very well marked form being (6) with flowers 1 in. in diam. and subglobose, fruit nearly 7 in. in diam.; and (5) with small fruit lobed at the apex.

2. **ACRONYCHIA PORTERI**, Hook. fil. Fl. Br. Ind. I, 498. A tree 15 to 30 (or even 50) feet high: young branches glabrous, pale. *Leaves* opposite or alternate, 1-foliolate; leaflet coriaceous, oblong, slightly obovate, usually acute or shortly acuminate, sometimes obtuse, the base much narrowed: both surfaces glabrous dull and opaque: main nerves 8 to 10 pairs, straight, oblique, slightly prominent beneath when dry; length 3 to 8 in., breadth 1·25 to 3 in., petiole ·5 to ·75 in. *Racemes* often several from one axil, sometimes as long as, but usually shorter than the leaves, slender, puberulous towards the apex, minutely bracteolate. *Flowers* ·15 in. in diam., much shorter than their pedicels, in pairs or sub-verticillate, globose in bud. *Sepals* triangular, acute.

Petals broadly ovate-oblong, pubescent inside. *Filaments* glabrous. *Ovary* glabrescent. *Style* very short; stigma large, ob-pyramidal, 4-lobed. *Drupe* ovoid, tapering to each end, 4-angled when dry, minutely pitted, 4-celled, but often only 2-seeded, .5 in. long and .3 in. diam. when dry.

Penang: Porter, Maingay (Kew Distrib.) No. 280, Curtis. Malacca: Griffith. Perak: Scortechini, King's collector.

6. GLYCOSMIS, Correa.

Unarmed shrubs or trees. *Leaves* 1-foliolate or imparipinnate; leaflets alternate. *Flowers* small, in axillary, rarely terminal panicles. *Calyx* 4-5-partite, segments broad, imbricate. *Petals* 4-5, imbricate. *Stamens* 8-10, free, inserted round a disc; filaments subulate, dilated below; anthers small, with often a dorsal or apical gland. *Ovary* 2-5-celled; style very short, persistent, stigma simple, ovules solitary and pendulous in each cell. *Berry* small, dry or fleshy, 1-3-seeded. *Seeds* oblong, testa membranous; cotyledons equal, radicle very short.—
DISTRIB.—Species 5, Asiatic and Australian.

Ovary glabrous: fruit globular 1. *G. pentaphylla*.

Ovary hairy: fruit oblong, narrowed at the
base 2. *G. sapindoides*.

Ovary rusty-pilose 3. *G. puberula*.

1. GLYCOSMIS PENTAPHYLLA, Corr. in Ann. Mus. VI, 384. A glabrous shrub or small tree. *Leaves* 3- to 5-foliolate, or 1-foliolate, leaflets sub-coriaceous, varying from elliptic-lanceolate, lanceolate, oblong, or obovate, or linear-lanceolate to oblong or even obovate; the apex acute, acuminate or obtuse; the edges entire or crenulate; the base narrowed; both surfaces shining; main nerves 4 to 9 pairs, oblique, curving, rather prominent beneath, and depressed above when dry; length 1.5 to 15 in., breadth .5 to 6 in., petiolule .1 to .5 in. *Panicles* cymose, puberulous to glabrous, varying much in size, usually axillary, but often terminal. *Flowers* small. *Ovary* glabrous, 5-celled, rarely 3- to 4-celled: style short, stout. *Berry* globose, white or bluish white, from the size of a pea to that of a cherry. Hook. fil. Fl. Br. Ind. I, 499; Kurz For. Burmah, I, 186; Miq. Fl. Ind. Bat. I, pt. 2, 522; DC. Prodr. i. 538; W. & A. Prodr. 93; Oliv. in Journ. Linn. Soc. v., Suppl. ii. 37; Wall. Cat. 6374; Thwaites Enum. 45 and 406; Dalz. & Gibs. Bomb. Fl. 29; Bedd. in Trans. Linn. Soc. xxv. 211; Flor. Sylv. Anal. Gen. xliii. t. 6, f. 6. *G. chylocarpa*, W. & A. Prodr. 93. *G. arborea*, DC. l. c.; Wall. Cat. 6373; Thwaites Enum. 45. *G. Retzii*, Roem. Synopz. fasc. i. 41. *Sclerostylis pentaphylla*, Bl. Bijdr. 135. *Limonia pentaphylla*, Retz Obs. v. 24; Roxb. Cor. Pl. t. 84; Flor. Ind. ii. 331. *L. arborea*, Roxb. Cor.

Fl. t. 85; Fl. Ind. l. c.; Bot. Mag. t. 2074. *Myxospermum chylocarpum*, Roem. Synops. fasc. i. 40.

In all the Provinces: common. DISTRIB.—Malayan Archipelago, British India, Philippine Islands, Australia.

A very variable and most perplexing species, the Protæan forms of which were first reduced to order by Professor D. Oliver (Journ. Linn. Soc. V, Suppl. II. p. 36). Of the forms recognised by Dr. Oliver only some are found in the Malayan Peninsula and Andaman Islands. Sir Joseph Hooker (in Fl. Br. Ind.) follows Professor Oliver for the most part; and from that book I copy the following account of the varieties. The Calcutta Herbarium is overloaded with specimens of this plant, many of which it is difficult to fit in under any of Professor Oliver's varieties; and for one of these I have ventured to suggest the varietal name *macrorachis*.

VAR. 1: Leaves usually 3-, rarely 1- or 5-foliolate; leaflets 4–9 in., lanceolate or oblong, or obovate-lanceolate, quite entire or obscurely crenulate; panicles towards the tips of the branches usually elongate, many-flowered; ovary usually covered with mamillary glands, 5-celled, connate with the disc at the base.—The commonest form in the Malay Peninsula.—DISTRIB.; British India.

VAR. 2: Leaves usually 3–5-foliolate (except sub-var. 1); leaflets elliptic or elliptic-lanceolate; panicles small, few or many-flowered, flowers smaller; ovary 4–5-celled, scarcely mamillate, constricted at the base and thus free from the disc.—*G. triphylla*, Wight in Hook. Bot. Misc. iii. 298, Suppl. t. 39; Ic. t. 167; W. & A. Prodr. 93. *G. nitida*, W. & A. Prodr. l. c.—The commonest form in the Andaman Islands. DISTRIB.—Western Peninsula, Ceylon, Tenasserim.

Sub-var. 1. *longifolia*: leaves usually 1-foliolate, leaflets 3–10 in., oblong or obovate-lanceolate, often acuminate or even caudate; panicles short, 1–2 in., or if terminal 3–4 in.—Malacca, Assam, the Khasia Mts., Rangoon.

Sub-var. 2. *macrophylla*: Leaves 3–5-foliolate, with the leaflets $3\frac{1}{2}$ –6 in., or 1-foliolate with the leaflets 8 to 12 in. long, by 2.5 to 6 in. broad. *G. macrophylla*, Lindl. in Wall. Cat. 6377, Miq. Fl. Ind. Bat. I, pt. 2 p. 522. *Chionotria rigida*, Jack in Mal. Misc. ex. Hook. Comp. Bot. Mag. I, 155. *Ch. monogyne*, Walp. Rep. I, 382. *Sclerostylis macrophylla*, Bl. Bijdr. 135. Penang. DISTRIB.—Assam. Tavoy.

Sub-var. 3. *macrorachis*, King, leaflets 1-foliolate, oblong-lanceolate, acuminate, 9 to 15 in. long and 3.5 to 5 in. broad: cymes small, pedicellate, arranged on a raceme 4 to 9 in. long. Penang: Curtis No. 89.

2. GLYCOSMIS SAPINDOIDES, Lindl. in Wall. Cat. 6376. A shrub. Leaves 5-to 7-foliolate; leaflets sub-coriaceous, oblong or lanceolate,

acuminate or sub-acuminate, both surfaces glabrous; main nerves 7 to 9 pairs, oblique, faint: length 3 to 8 in., breadth 1 to 3 in., petiole about .2 in. *Panicles* cymose, sub-pyramidal, axillary and terminal. *Flowers* shortly pedicelled. *Ovary* 2- to 3-celled, hairy, about as long as the thick style. *Berry* oblong, narrowed to the base, usually 1-seeded. Hook. fil. Fl. Br. Ind. I, 501. *G. cyanocarpa*, Spreng. var. *sapindoides*, Kurz in Journ. Bot. for 1876, p. 34.

Penang: Wallich, Maingay, Curtis. **DISTRIB.**—Sumatra, Java, Sikkim.

I doubt very much indeed whether this would not be better treated as a variety of *G. pentaphylla*, than as a species. Except the hairiness and the smaller number of cells usually found in its ovary, and its oblong fruit, I see nothing to distinguish it.

3. *GLYCOMIS PUBERULA*, Lindl. in Wall. Cat 6375. A shrub: *leaves* usually 3-foliolate; leaflets sub-coriaceous, ovate to oblong-lanceolate, more or less bluntly acuminate; the base rounded or cuneate, lower surface pale when dry; main nerves about 8 pairs, spreading; length 2.5 to 4.5 in., breadth .75 to 1.5 in. *Panicles* short, axillary; flowers in short pedicels; disc small, adnate to the 4- to 5-celled oblong rusty-pilose ovary. *Style* very short.

Penang: Singapore, Perak: not common.

Except in its pilose ovary this differs but little from *G. pentaphylla* Corr., of which it would be perhaps well to treat it as a form.

7. *MICROMELUM*, Blume.

Unarmed trees. *Leaves* imparipinnate; leaflets alternate, oblique. *Flowers* in large terminal corymbose cymes. *Calyx* cupular, 3-5-toothed or lobed. *Petals* 5, free, thick, valvate or subimbricate. *Stamens* 10, free, inserted round a short or long disc; filaments linear-subulate, alternately shorter. *Ovary* 5- rarely 2-6-celled; style constricted at the base, deciduous, stigma obtuse or capitate; ovules 2, superposed in each cell. *Berry* small, dry, usually 1-2-seeded, septa spirally twisted. *Seeds* oblong, testa membranous; cotyledons leafy, crumpled, radicle long.—**DISTRIB.**—Species 3 or 4: tropical Asiatic and Oceanic.

A large shrub or small tree: fruit glabrous ... 1. *M. pubescens*.

A small shrub, never a tree: fruit pubescent... 2. *M. hirsutum*.

1. *MICROMELUM PUBESCENS*, Blume Bijdr. 137. A large shrub or small tree; the young parts more or less pubescent or puberulous, the older often glabrescent or even glabrous. *Leaves* 6 to 18 in. long: leaflets 9 to 15, alternate or sub-opposite, membranous, broadly lanceolate to ovate, acuminate, the edges undulate, sub-cuneate or entire; the base cuneate, often very oblique; main nerves 9 to 12

pairs, oblique, not prominent; length 1·5 to 3·5 in., breadth ·5 to 2 in., *Cymes* large, terminal, much branched, pedunculate, 4 to 8 in. in diam., many-flowered, minutely bracteolate. *Flowers* ·25 to ·5 in. in diam., on pedicels ·1 to ·2 in. long, buds oblong. *Calyx* sub-entire or 5-toothed. *Petals* linear-oblong, sub-acute. *Filaments* alternately longer. *Ovary* mostly pubescent, usually 5-celled. *Berry* ovoid or oblong, ·3 to ·4 in. long, pitted, glabrescent, 1-seeded. Hook. fil. Fl. Br. Ind. I, 501; Kurz For. Flora Burmah I, 186: Oliv. in Journ. Linn. Soc. v. Suppl. ii. 40; Bedd. Flor. Sylv. Anal. Gen. xliii. t. 7, f. 1; Thwaites Enum. 46. *Bergera integerrima*, Roxb. Fl. Ind. ii. 376; Wall. Cat. 6371. *Aurantiacea*, Wall. Cat. 8517, 8518.

In all the Provinces. DISTRIB.—British India, China, the Malayan Archipelago, and Australasia.

2. *MICROMELUM HIRSUTUM*, Oliver in Journ. Linn. Soc. V. Suppl. II, 40. A shrub, all parts (but especially the inflorescence) more or less tomentose, rarely glabrescent. *Leaves* 6 to 12, rarely 15 in. long; leaflets membranous, 9 to 25, lanceolate or oblong-lanceolate, rarely ovate, shortly acuminate, the edges obscurely serrate, the base often oblique, lower surface softly tomentose; main nerves 5 to 10 pairs, rather prominent beneath: length 1·5 to 3·5 in., breadth ·8 to 1·5 in. *Cymes* terminal, very tomentose, often lax, and 6 to 8 in. in diam., but sometimes condensed and only 2 in. in diam. *Flowers* ·25 in. in diam. *Calyx* deeply 5-lobed, hirsute. *Ovary* villous. *Berry* oblong or obovoid, pubescent, pitted. Hook. fil. Fl. Br. Ind. I, 502; Kurz For. Flora Burmah I, 187: Wall Cat. 8516.

Penang, Singapore, Perak, but not very common. DISTRIB.—British India, Burmah, Philippines.

This is closely allied to *M. pubescens*, but is usually a smaller shrub. The chief differences between the two lie in the greater amount of pubescence in this, and the smaller size of its flowers.

8. *MURRAYA*, Linn.

Unarmed shrubs or small trees. *Leaves* pinnate; leaflets alternate, petioled, base oblique or cuneate. *Flowers* solitary and axillary, or in terminal corymbs or axillary cymes. *Calyx* 5-fid or partite. *Petals* 5, free, imbricate. Stamens 10, inserted on an elongate disc; filaments subulate, alternately shorter: anthers shortly ovate. *Ovary* 2- to 5-celled, narrowed into the long deciduous style, stigma capitate; ovules solitary, or 2 superposed or collateral in each cell. *Berry* oblong or ovoid, 1- to 2-celled, 1- to 2-seeded. *Testa of seed* woolly or glabrous; cotyledons fleshy, plano-convex, similar. DISTRIB.—4 species, tropical Asiatic.

1. *MURRAYA EXOTICA*, Linn. A glabrous shrub or small tree: young branches terete, the bark pale when dry. *Leaves* 4 to 5 in. long, 3-to 8-foliolate; leaflets thinly coriaceous, shining, ovate or ovate-lanceolate, occasionally rhomboid, more or less obtusely acuminate, the apex often notched, edges entire; the base cuneate, often oblique. *Corymbs* terminal, few-flowered. *Flowers* campanulate. *Sepals* acute. *Petals* oblong-lanceolate, white. *Ovary* 2-celled, style slender, stigma capitate. *Berry* ovoid or sub-globose, shining, red when ripe, 5 in. long, 2-seeded. Hook fil. Fl. Br. Ind. I, 502; Miq. Fl. Ind. Bat. I, Pt. 2 p. 522; Kurz For. Flora Burmah I, 190; Oliver in Jour. Linn. Soc. V, Suppl. II, 28; Roxb. Fl. Ind. II, 374; Blume Bijdr. 1363; Wall. Cat. 6368; Thwaites Enum. 45; Wight Ic. t. 96; Brandis For. Flora N. India, 48. *M. exotica* and *brevifolia*, Thwaites Enum. 45. *M. paniculata*, Jack in Mal. Misc. I, 31 ex Hook. Bot. Misc. II, 79; DC. Prodr. I, 537; W. & A. Prodr. 94; Dalz. and Gibs. Bomb. Flor. 29. *M. sumatrana*, Roxb. Fl. Ind. II, 375; Wall. Cat. 6369; Miq. Fl. Ind. Bat. I, c. 523. *Chalcas paniculata*, Linn. *Ch. sumatrana*, Roem. Synops. fasc. I, 49. *M. Glenieii*, Thwaites Enum. 406; Oliv. in Journ. Linn. Soc. v. Suppl. II, 29.

Andaman Islands. Malayan Peninsula, Griff. (Kew Distrib.) No. 520. **DISTRIB.**—British India, China, Australia. Much cultivated in gardens on account of the fragrance of its flowers.

9. *CLAUSENA*, Burm.

Unarmed shrubs or trees. *Leaves* imparipinnate, usually deciduous, leaflets membranous. *Flowers* small, in terminal or axillary cymes panicles or lax racemes. *Calyx* 4-5-lobed or-partite. *Petals* 4-5, free, membranous, margins imbricate. *Stamens* 8-10, inserted round an elongated disc, the alternate shorter; filaments usually dilated or arched and concave below the subulate tip; anthers short. *Ovary* stipitate, 4-5- (rarely 2-3-) -celled; style usually distinct, deciduous; stigma obtuse, entire or 2-5-lobed; ovules 2, collateral, or superposed in each cell. *Berry* small, ovoid, oblong or globose, 2-5-celled. *Seeds* oblong, testa membranous; cotyledons equal, plano-convex. **DISTRIB.** Species about 14; chiefly tropical Asiatic, with a few African and Australian.

1. *CLAUSENA EXCAVATA*, Burm. Fl. Ind. 87. A shrub or small tree: young branches pubescent or tomentose, as are the young leaves and the inflorescence. *Leaves* 6 to 12 in. long; leaflets 15 to 29, membranous, lanceolate to oblong-lanceolate, acuminate, obscurely crenate; the base narrowed, very oblique; the upper surface when adult glabrescent or glabrous; length 1.5 to 3.4 in., breadth .5 to 1 in.; petiolule .1 in.. *Panicle* terminal, pyramidal, its length 4 to 12 in., of which the peduncle forms a third; branches spreading, alternate. *Flowers* .25

in. in diam., with globose buds, 4-merous; pedicels longer than the flowers. *Calyx* much shorter than the oblong glabrous petals. *Ovary* ovoid, slightly 4-angled, hairy, stipitate; style stout, about as long as the ovary. *Fruit* broadly ovoid, blunt at each end, 1- to 2-seeded. Hook. fil. Fl. Br. Ind. I., 504; Miq. Fl. Ind. Bat. I., pt. 2, p. 524; Kurz For. Flora Burmah I, 188; Blume Bijdr. 139; DC. Prodr. I. 538; Oliv. in Journ. Linn. Soc. v. Suppl. ii. 31. *Murraya Burmanni*, Spreng. Syst. Veg. ii. 315. *Amyris sumatrana* and *punctata*, Roxb. Fl. Ind. ii. 250, 251. *Cookia graveolens*, W. & A. Prodr. 95; Wall. Cat. 8515. *Gallesioa graveolens*, Roem. Synops. fasc. i. 45.

In all the provinces except the Andaman and Nicobar islands. **DISTRIB.**—British India, Malayan Archipelago, near the bases of hill ranges.

10. TRIPHASIA, Lour.

A spiny shrub. *Leaves* alternate, sessile, 3-foliolate; leaflets obtuse, crenate, the lateral smaller. *Flowers* solitary or in 3-flowered cymes, axillary. *Calyx* 3-lobed. *Petals* 3, free, imbricate. *Stamens* 6, inserted round a fleshy disc; filaments free, subequal, dilated at the base, anthers linear. *Ovary* ovoid, 3-celled, narrowed into a slender deciduous style; stigma obtuse or capitate and 3-lobed; ovules solitary in each cell. *Berry* small, ovoid, 1-3-celled, 1-3 seeded. *Seeds* oblong, immersed in mucilage, testa coriaceous; cotyledons plano-convex, often unequal or lobed.

1. TRIPHASIA TRIFOLIATA, DC. Prodr. I, 536. A small glabrous spiny shrub. *Leaflets* coriaceous with obscure nerves, crenulate, dissimilar; the terminal one shortly petiolate, ovate, obtuse, retuse, the base cuneate; the lateral smaller, oblique. *Flowers* about .5 in. long, white. *Petals* linear-oblong. *Fruit* ovoid, apiculate, glandular-dotted. Hook. fil. Fl. Br. Ind. I, 507; Miq. Fl. Ind. Bat. I. pt. 2. p. 519; Kurz For. Flora Burmah, I, 191; Blume Bijdr 132; Oliv. Journ. Linn. Soc. v. Suppl. ii. 26; W. & A. Prodr. 91; Dalz. & Gibs. Bomb. Fl., Suppl. 12. *T. aurantiola*, Lour. Fl. Fl Coch. I, 189; Wall. Cat. 6381. *Limonia trifoliata*, Linn.; Burm. Fl. Ind. t. 35, f. 1.; Bl. Bijdr. 132. *L. diacantha*, DC. Prodr. i. 536.

Nicobar Islands: Kurz. **DISTRIB.** British India and various tropical countries, but often doubtfully wild. It is possible this may not really be indigenous in the Nicobars, as these islands have for ages been frequented by Malayan pirates, who may have inadvertently introduced it.

11. LUVUNGA, Hamilt.

Glabrous, climbing shrubs, usually armed with axillary (often hooked) spines. *Leaves* 3-foliolate; leaflets coriaceous, quite entire.

Flowers in axillary fascicled or paniced racemes. *Calyx* cupular, entire or obscurely 4-6-lobed. *Petals* 4-5, free, linear-oblong, thick, imbricate. *Stamens* 8 or 10, inserted around a cupular annular or elevated disc; filaments equal or not, linear-subulate, free or cuneate; anthers linear or linear-oblong. *Ovary* 2-4-celled; style stout, deciduous, stigma capitate; ovules 2, superposed in each cell. *Berry* large, ellipsoid, with a thick rind, 2-3-seeded. *Seeds* large, ovoid; testa membranous, nerved; cotyledons equal, oblong, fleshy,—DISTRIB. About 4 species: tropical Asiatic.

Leaflets oblong-lanceolate to oblong-oblan-
ceolate; filaments glabrous, united into
a tube 1 *L. scandens*.

Leaflets elliptic, more or less obovate;
filaments free, often woolly 2 *L. eleutheranthera*.

1. LUVUNGA SCANDENS, Ham. in Wall. Cat. 6382. A large woody climber. *Leaflets* oblong-lanceolate to oblong-oblan- ceolate, acute or blunt, the base narrowed, nerves very obscure; length 4 to 12 in., breadth 1 to 2 in., petiolules about .2 in.; petioles terete, stout, 2 to 5 in. long. *Cymes* many-flowered, short, broad, (1.5 to 2 in. across), on short peduncles. *Flowers* .5 to .75 in. long, white. *Calyx-lobes* short, obtuse. *Petals* 4, fleshy, recurved. *Stamens* with glabrous filaments united into a tube (sometimes for three-quarters of their length). *Ovary* 3- to 4-celled. *Berry* of the size of a large olive, yellowish, obscurely 3-lobed, the pericarp smooth. Hook. fl. Fl. Br. Ind. I, 509; Kurz For. Flora Burmah I, 191; Wight Ill. i. 108; Oliv. in Journ. Linn. Soc. v. Suppl. ii. 43; Bot. Mag. t. 4522. Pierre For. Flora Coch. Chine, t. 288. *Limonia scandens*, Roxb. Fl. Ind. ii. 380.

Malacca: Maingay (Kew Distrib.) No. 285. DISTRIB. British India.

2. LUVUNGA ELEUTHERANTHERA, Dalz. in Hook. Kew Journ. Bot. II. 258. A woody climber like the last, the spines usually hooked; leaflets elliptic and usually more or less obovate, shortly and abruptly acuminate; main nerves 8 to 12 pairs, slightly prominent. *Cymes* axillary, many- or few-flowered. *Filaments* free, often woolly in the upper part. *Fruit* as in the last. Hook. fl. Fl. Br. Ind. I. 511; Oliv. in Journ. Linn. Soc. v. Suppl. ii. 44; Dalz. & Gibs. Bomb. Flor. 30. *L. tavoyana*, Lindl. in Wall. Cat. 6383. *L. scandens* and *eleutheranthera*, Thwaites, Enum. 47, 48, 406. *Triphasia sarmentosa*, Blume Bijd. 132; Miq. Fl. Ind. Bat. I. pt. 2, p. 520.

Perak: common. Pahang. Penang.—DISTRIB. Malayan Archipelago, W. Peninsula of British India, Ceylon.

This plant differs from *L. scandens* (to which it is closely allied) in having more obovate leaves, with much more distinct nervation, and

free filaments which are often woolly. It appears to be pretty widely distributed in Java, and is I think without doubt Blume's *Triphasia sarmentosa*.

12. PARAMIGNYA, Wight.

Erect or climbing shrubs, unarmed, or with axillary spines. *Leaves* 1-foliolate, the joint often obscure, quite entire, subcoriaceous, persistent. *Flowers* rather large, axillary, solitary or fascicled. *Calyx* cupular or small, and 4-5-lobed. *Petals* 4-5, free, imbricate or rarely induplicate-valvate. *Stamens* 8-10, inserted round a columnar disc; filaments free, linear, equal or subequal, anther linear-oblong. *Ovary* 3-5-celled; style elongate, deciduous; ovules in each cell solitary, or 2 obliquely superposed. *Berry* ovoid or subglobose, often contracted at the base, 1-5-seeded, rind thick. *Seeds* large, oblong, much compressed, testa membranous; cotyledons fleshy, equal.—DISTRIB.—Species 6; tropical Indian.

Spines short, solitary, axillary, curved, pubescent; flowers .7 in. long, on slender pedicels { 1 *P. armata*. VAR.
longer than themselves } *andamanica*.

Spines long, in pairs, stipular, straight, glabrous;
flowers .35 in. long, on short pedicels ... 2 *P. longispina*.

1. PARAMIGNYA ARMATA, Oliver in Journ. Linn. Soc. V. Suppl. II, 43, VAR. ANDAMANICA, King. A scandent shrub; young branches slender, puberulous, speedily becoming glabrous. *Leaflets* elliptic or elliptic-oblong, sub-acute or acute, the base rounded; glabrous except (when young) the upper surface of the midrib near the base; the reticulations and the 10 to 12 pairs of spreading main nerves slightly prominent on the lower surface when dry, the glandular dots also rather prominent; length 4 to 5.5 in., breadth 1.5 to 2.75 in.; petiole .5 in., pubescent when young especially on the upper surface. *Spines* short, solitary in the axils below the pedicels, slightly curved, pubescent. *Flowers* axillary, in pairs, on slender sparsely pubescent pedicels longer than themselves; pedicels 1.25 to 1.5 in. long, bracteolate at the base. *Calyx* short, deeply divided into 5 broadly obtuse, spreading lobes. *Petals* about five times as long as the calyx, linear-oblong, obtuse, glabrous, .6 in. long. *Stamens* 10, free, almost as long as the petals: the filaments rather thick and woolly below, slender and glabrous towards the apex; anthers narrowly oblong. *Disc* short, cylindrical; not broader than the ovary. *Ovary* ovoid; style elongate, crowned by the discoid stigma, all glabrous. *Fruit* globular or turbinate, smooth, .5 to .65 in. in diam.

Andaman Islands: common.

This differs from the typical *P. armata*, Oliver, as it occurs in

Western Peninsular India and in Ceylon, mainly in the size of its leaves, and in its flowers being less numerous in their axils. In its flowers it agrees well with the typical form. It also resembles *P. monophylla*, W. and A.; but the filaments of the stamens of that species are glabrous or nearly so, and taper suddenly to a short point, while the filaments of this are thick and woolly in the lower three-fourths, the upper fourth being filiform and glabrous. The ovary of this is glabrous, of that pubescent; moreover the flowers of this are on long filiform pedicels which arise by pairs from the axils; while in *P. monophylla* the pedicels are short, and are united above the point of origin from the axil. The calyx of *P. monophylla* is besides longer, but much less deeply lobed; it is also pubescent or tomentose, while the calyx of this is glabrous. The disc in this plant is nothing more than a short gynophore.

2. *PARAMIGNYA LONGISPINA*, Hook. fil. Fl. Br. Ind. I, 511. A small rigid glabrous tree; branches rather stout, armed with stout straight spines .75 to 1.5 in. long, and rising from each side of the insertion of the petioles. *Leaves* elliptic-oblong to elliptic, acute or obtuse, the base rounded, nerves indistinct, length 2.5 to 4.5 in., breadth 1.1 to 1.75 in., petiole .2 in. *Flowers* .35 in. in diam., axillary, solitary or 2 or 3 together, pedicels short. *Calyx* 5-toothed. *Petals* oblong, obtuse. *Stamens* 10, equal, glabrous; anthers narrow, as long as the filaments, apiculate. *Ovary* glabrous, standing on the disc (gynophore): style stout, cylindric; ovules in pairs. *Fruit* ovoid, much apiculate, 1.25 to 1.75 in. long, glabrous, 3 or 4-celled; the pericarp coriaceous. *Seeds* compressed, beaked. *Atalantia longispina*, Kurz Journ. As. Soc. Bengal, for 1872, pt. 2, p. 295. *Paramignya angulata*, Kurz For. Flora Burmah, I, 194. *Gonocitrus angulatus*, Kurz in Herb. Calc. *Citrus angulata*, Willd. ? *Limonia angulata*, W. & A. Prodr. 91; Miq. Fl. Ind. Bat. I, pt. 2. p. 521. Malacca: Maingay (Kew Distrib.) l. c. 286. Perak: Scortechini
DISTRIB.—Burmah.

13. *ATALANTIA*, Correa.

Unarmed or spinous shrubs or trees. *Leaves* alternate, 1-foliolate, coriaceous, persistent, quite entire or crenulate; stipule-like scales often present at the base of the petioles and spines, which belong to undeveloped leaf-buds. *Flowers* axillary, rarely terminal, fascicled or or in short racemed corymbs, or panicles, rarely solitary. *Calyx* 3-5-lobed or, partite-rarely irregularly split. *Petals* 3-5, free or adnate to the stamens and united with them into a tube, imbricate. *Stamens* 6-8, rarely 15-20, inserted round an annular or cupular disc, filaments free or irregularly connate, subequal or the alternate shorter; anthers

short, ovate-oblong, or base cordate. *Ovary* 2- or 4-, rarely 3- or 5- celled : style deciduous, stigma capitate ; ovules solitary or 2 collateral in each cell. *Berry* large, sub-globose, 1-5-celled, 1-5-seeded, rind thick. *Seeds* oblong ; cotyledons fleshy, plano-convex.—*DISTRIB.*—Species about 10, chiefly tropical Asiatic.

Armed ; leaves 1·25 to 2·5 in. long ... 1. *A. monophylla*.

Unarmed ; leaves 4 to 6 in. long ... 2. *A. Roxburghiana*.

1. *ATALANTIA MONOPHYLLA*, Correa Ann. du Mus. VI, 383. A large shrub or small tree : the young branches sometimes pubescent at the very tip, usually more or less armed with short, solitary, straight, axillary spines. *Leaves* lanceolate, oblong-ovate, ovate or elliptic ; the apex obtuse, often notched, the edges entire, the base slightly cuneate ; both surfaces glabrous, the nerves and reticulations rather distinct when dry ; length 1·25 to 2·5 in., breadth ·6 to 1·2 in. ; petiole ·2 to ·3 in. puberulous. *Flowers* ·35 to ·5 in. in diam., in lax axillary racemes or cymes, the pedicels puberulous, slender, longer than the flowers ; buds sub-globose or obovate. *Calyx* irregularly lobed, glabrous, the edges scarious. *Petals* oblong, obtuse, ·3 to ·4 in. long. *Stamens* 8, or fewer ; the filaments broad and united into a tube, their apices free and filiform, the anthers ovate. *Ovary* sessile, on a small annular disc. *Berries* ovoid at first, globose when ripe, ·6 to ·8 in. in diam. Hook. fil. Fl. Br. Ind. I, 511 : Miq. Fl. Ind. Bat. I, Pt. 2, p. 519 ; Kurz For. Flora Burmah I, 195 : DC. Prod. I, 535 ; W. and A. Prodr. 91 ; Wight Ill. I, 108 ; Wall. Cat. 6353 ; Oliv. in Journ. Linn. Soc. v. Suppl. II, 24 : Dalz. and Gibs. Bomb. Flor. 28. *A. floribunda*, Wight, Ic. t. 1611. *A. platistigma*, Wight Ill. I, 108. *Limonia monophylla*, Linn. ; Roxb Cor. Pl. I, t. 82 ; Fl. Ind. II, 378. *Turræa virens*, Hellen. in Act. Holm. 1788, t. 10, f. I, (not of Linn.). *Trichilia spinosa*, Willd. ; DC. Prodr. I, 623. Rheede Hort. Mal. IV, t. 12 ; Burm. Fl. Zeyl. t. 65, f. I.

Penang, Kedah, Andaman and Nicobar Islands. *DISTRIB.*—British India, in Sylhet, and in the Peninsula, Ceylon.

The plant named *A. macrophylla* by Kurz (For. Fl. Burmah I, 195), of which there are excellent specimens in the Calcutta Herbarium, seems to be only a luxuriant form of this. I can find no characters in which it differs, except size.

2. *ATLANTIA ROXBURGHIANA*, Hook. fil. (not of Oliver), Fl. Br. Ind. I, 513. A glabrous shrub or small tree : young branches slender, spineless. *Leaves* thinly coriaceous, elliptic or elliptic-oblong, tapering to each end, the apex sub-acute or shortly acuminate ; the base cuneate, rarely rounded ; main nerves 10 to 14 pairs, spreading, slightly prominent underneath when dry ; length 4 to 6 in., breadth 1·75 to 2·25 in., petiole ·3 in. *Racemes* short, few-flowered, axillary. *Flowers* nearly ·5

in. in diam., buds globose. *Calyx* with 4 obtuse lobes. *Petals* 4, obovate. *Stamens* 8; the anthers oblong-ovoid; filaments free, short, subulate. *Ovary* ovoid, sessile, 2-celled. *Berry* globose when ripe, glabrous, .6 to .8 in. in diam. Hook. fil. Fl. Br. Ind. I, 513. *Sclerostylis Roxburghii*, Wight, Ic. t. 72. *Amyris simplicifolia*, Roxb. Fl. Ind. II, 244.

Perak: common. Penang, Malacca; Griffith (Kew Distrib.) No. 537.

There are in the Calcutta Herbarium a large number of fruiting specimens of this from Perak; but not a single one in flower. These specimens agree so entirely with Roxburgh's figure of *Amyris simplicifolia* in the Calcutta Herbarium (of which Wight's Ic. 72 is a copy) and with Griffith's Malacca specimen (No. 537), that I have no hesitation in referring them to the same species. The description of the flowers given above is copied from Sir Joseph Hooker's Fl. Br. Ind. I, 513.

ORDER XXIV. SIMARUBEÆ.

Trees or shrubs, usually with bitter bark. *Leaves* alternate, often large, pinnate or rarely simple; stipules 0 or deciduous. *Inflorescence* axillary, racemose, paniculate or cymose, rarely spicate. *Flowers* usually diclinous, regular, and generally small. *Calyx* 3-5-lobed, valvate or imbricate. *Petals* 3-5, very rarely 0, hypogynous, valvate or imbricate. *Disc* annular or elongate, simple or lobed, rarely 0. *Stamens* as many or twice as many as the petals, rarely indefinite, inserted at the base of the disc; filaments free, often with a scale at the base; anthers oblong, usually introrse, 2-celled, dehiscing longitudinally. *Ovary* free, 1-6-celled, usually deeply lobed, less often entire; styles 2-5, free, or more or less united, stigmas capitate; ovules usually solitary in each cell, rarely more numerous, raphé ventral, micropyle superior. *Fruit* drupaceous, capsular, or occasionally samaroid, usually of 2-6 distinct carpels. *Seeds* usually solitary, erect or pendulous, albuminous; embryo straight or curved, radicle superior.—DISTRIB. Tropical and subtropical regions of both hemispheres; genera 30; species about 130.

Ovary deeply 4- or 5-lobed; fruit separating into cocci; leaves pinnate.

Stamens 8 to 10, filaments with dilated ciliate bases 1. *Harrisonia*.

Stamens 4.

Disc entire: flowers in branching panicles; leaves glabrous ... 2. *Picrasma*.

Disc 4-lobed; flowers in small cymes, collected in long narrow panicles; leaves pubescent ... 3. *Brucea*.

Stamens 5; disc 5-lobed; flowers in long
much-branched panicles; leaves glab-
rous 4. *Eurycoma*.
Ovary not lobed; fruit not separating into
cocci; leaves simple 5. *Irvingia*.

1. HARRISONIA, Brown.

Glabrous spiny shrubs. *Leaves* unequally pinnate or 1-foliolate. *Flowers* hermaphrodite, in bracteate cymes. *Calyx* small, 4-5-fid. *Petals* 4-5, longer than calyx. *Disc* hemispherical. *Stamens* 8-10, dilated at the base. *Ovary* globose or 4-5-lobed, 4-5-celled; styles connate or distinct at the base; ovules solitary, pendulous. *Fruit* a small globose berry. *Seed* solitary, sparingly albuminous.—*DISTRIB.* Tropics of Old World and of Australia. *Species* 3-4.

1. HARRISONIA BROWNII, A. Juss. in Mem. Mus. Par. XII, 517, 540, t. 28. A shrub; young branches slender, glabrous, lenticellate, often armed with sharp conical prickles usually in pairs. *Leaflets* 3, ovate to rhomboid, acuminate, coarsely serrate; the terminal one the largest, petiolulate, and much narrowed at the base; the two lateral sessile and slightly narrowed; length from .6 to 1 in. *Flowers* 1 to 3, when expanded .3 in. long, tetramerous, from small axillary tubercles on slender pedicels from .5 to .75 in. long, buds globose. *Petals* lanceolate, reflexed. *Stamens* 8, erect, as long as the petals; filaments with dilated concave hairy bases, anthers ovate. *Ovary* deeply 4-lobed, 4-celled, glabrous. *Fruit* pisiform, depressed, 3-2- or even 1-celled by abortion, each cell one-seeded; pericarp coriaceous, glabrous. *Planch.* in Hook. Lond. Journ. Bot. V. 569; Benth. Fl. Austral. I, 376.

S. Andaman: Kurz, King's collectors. *DISTRIB.*—Timor., N. Australia. Philippines.

2. PICRASMA, Blume.

Trees or shrubs with bitter properties. *Leaves* unequally pinnate. *Flowers* small, declinous or polygamous, in axillary panicles. *Calyx* very small, 4-5 toothed. *Petals* 4-5, valvate, very often increasing after flowering. *Disc* thick, entire. *Stamens* 4-5, not scaly, hairy. *Ovary* 3-5-partite, free; style distinct at the base and apex, but united in the middle, stigmas simple; ovules erect, solitary. *Fruit* of 1-3 fleshy or coriaceous drupes. *Seed* erect, albuminous.—*DISTRIB.* India, Malay Archipelago, China, Japan, West Indies, Brazil. *Species* about 4.

1. PICRASMA JAVANICA, Blume, Bijdr, 248. A tree 30 to 60 feet high; young branches glabrous, dark-coloured, rather slender. *Leaflets* 3 to 7, membranous, elliptic-oblong, elliptic-lanceolate or elliptic, more or less

acuminate or caudate-acuminate, the edges entire or (especially in old leaves) thickened and minutely undulate, the base narrowed or rounded; both surfaces glabrous; main nerves 4 to 6 pairs, ascending, curved, rather prominent and pale beneath in adult leaves. *Panicles* axillary, on long peduncles, branching. *Flowers* numerous, crowded at the extremities of the branchlets, 4-merous, .15 to .25 in. in diam. *Sepals* broadly ovate, spreading, pubescent, minute. *Petals* much larger than the sepals, ovate, concave, nerved, puberulous. *Stamens* 4; the filaments pubescent in the male, villous in the female flower. *Ovary* deeply 4-lobed, puberulous; the disc entire, woolly. *Style* single; stigmas 4, reflexed. *Fruit* of 1 to 3 sub-globular coriaceous drupes seated on the enlarged disc, and surrounded by the enlarged coriaceous curved petals. Benn. *Plantae Javan. Rarior.* 197. t. 41; Planch. in Hook. *Lond. Journ. Bot.* V, 573; Hook. *fil. Fl. Br. Ind.* I, 520; Kurz for *Flor. Burma*, I, 201. *P. nepalensis*, Benn. in Wall. *Cat. sub No.* 8506. (*Lith. Cat.* p. 287); *Pl. Jav. Rar.* 201; Planch. in Hook. *Journ. Bot.* V, 573. *P. andamanica*, Kurz *Andam. Rep. App.* IV; Hook. *fil. Fl. Br. Ind.* I, 520; *Brucea?* Wall. *Cat.* 7499. *B. dubia*, Steud. *Nomencl.* Wall. *Cat. indeterminata*, No. 9037.

Malacca, Perak, Andamans. *DISTRIB.*—Malayan Archipelago, sub-Himalayan tracts, Assam, Khasia Hills and Burmah, in British India.

I can find nothing to distinguish *P. nepalensis* Benn. and *P. andamanica*. Kurz from *P. javanica*, Blume. In fact Kurz himself reduced his species *P. andamanica* to *P. javanica*; and in his latest book (*The Flora of British Burmah*), he does not give the name *P. andamanica*, which was in fact originally published in a hastily prepared official report. And, as for *P. nepalensis*, Benn.—its author declares in his original description of it, that it differs from *P. javanica*, Bl., only by having sometimes as many as seven leaflets, and in their being more acuminate than is usual in specimens from Java.

3. BRUCEA, Mill.

Bitter trees or shrubs. *Leaves* large, unequally pinnate. *Flowers* in minute, numerous, very small cymes, collected into long narrow axillary panicles. *Calyx* minute, 4-partite, imbricate. *Petals* 4, minute, linear, imbricate. *Disc* 4-lobed. *Stamens* 4, inserted beneath the disc, filaments naked. *Ovary* 4-lobed, or consisting of 4 entirely free carpels. *Drupes* 4, entirely free, ovoid, somewhat fleshy. *Seed* solitary, exalbuminous.—*DISTRIB.* Tropics of Old World and of Australia. *Species* 6.

1. BRUCEA SUMATRANA, Roxb. *Fl. Ind.* I, 449. A shrub 4 to 6 feet high; young branches rather stout, tawny-pubescent. *Leaflets* about

9, membranous, lanceolate, acuminate, very coarsely dentate-serrate; the base oblique, acute, or obtuse; both surfaces, but especially the lower, softly yellowish-pubescent, 1·5 to 3·5 in. long (the whole leaf from 10 to 14 in. long), petiolule ·15 to ·25 in. long. *Panicles* often as long as the leaves, very narrow. *Flowers* minute, purple, in short distant cymules; the sepals smaller than the petals, both pubescent. *Stamens* about as long as the petals, the filaments short. *Drupes* black when ripe, oval, glabrous, ·15 to ·2 in. long. DC. Prod. II, 88; Wall. Cat. 8482; Blume Bijdr., 1167; Planch. in Hook. Lond. Journ. Bot. v., 575; Hook. fil. Fl. Br. Ind. I, 523; Kurz For. Flora, Burma, I, 202.

In all the provinces except the Andaman and Nicobar Islands.—
DISTRIB. Malayan Archipelago, British India.

4. EURYCOMA, Jack.

Shrubs or small trees, with bitter bark. *Leaves* very large, unequally pinnate, with entire glabrous leaflets. *Flowers* polygamous, in much-branched sub-terminal glandular-hairy panicles. *Calyx* minute, 5-toothed, valvate. *Petals* 5, induplicate-valvate. *Disc* consisting of 5 glands alternating with the stamens. *Stamens* in male and hermaphrodite flowers 5, smaller in the latter; filaments attached to the base of the petals. *Ovary* 5-partite, free; styles 5, connate, stigmas distinct. *Drupes* 3-5, stipitate. *Seed* solitary, pendulous, exalbuminous.—DISTRIB. Malaya, Philippines. Species 2.

- Branches 1 in. thick, rusty-pubescent; petals
 ·25 in. long, thick, pubescent on both surfaces 1. *E. longifolia*.
 Branches ·25 in. thick, glabrous, pale; petals
 ·35 in. long, thin, glabrous inside ... 2. *E. apiculata*.

1. EURYCOMA LONGIFOLIA, Jack Roxb. Fl. Ind. ed. Carey, II, 307.
 A shrub or small tree; young branches about 1 in. in diam., densely rusty-tomentose, with large cicatrices. *Leaves* 18 to 24 in. long; the leaflets numerous, coriaceous, oblong-lanceolate, acute, entire; the base oblique, cuneate; both surfaces glabrous, the upper shining; length 3 to 4 in., breadth ·75 to 1 in. *Panicles* usually shorter than the leaves, much-branched, many-flowered, clothed (especially in the younger parts) with rufous glandular hairs. *Calyx* much shorter than the corolla, the segments ovate, spreading. *Petals* thick, erect, ovate-lanceolate, purple, pubescent, slightly glandular in the upper half outside, ·25 in. long. *Stamens* longer than the calyx, alternating with 5 rather large bilobed ciliate glands which are large in the male and small in the hermaphrodite. *Fruit* of 1 to 5, stipitate, narrowly ovoid, apiculate, ridged drupes, ·5 in. long and ·25 in. diam.; the pericarp coriaceous, purple, glabrous. DC. Prodr. ii. 86; Wall. Cat. 8522; Planch. in Hook. Lond. Journ.

Bot. v. 584. *E. merguensis*, Planch. l. c.; *E. tavoyana*, Wall. Cat., 8523; Hook. fil. Fl. Br. Ind. I, 521; Kurz For Flora Burmah. I, 202.

In all the provinces except the Andaman and Nicobar islands. **DISTRIB.**—Malayan Archipelago, Philippines, Burmah.

2. *EURYCOMA APICULATA*, A. W. Bennett in Hook. fil. Fl. Br. Ind. I, 522. A shrub or small tree; young branches about .25 in. thick, nearly glabrous, rather pale. *Leaves* 12 to 15 in. long; the leaflets numerous, sub-coriaceous, oblong-lanceolate, shortly and rather abruptly acuminate; the base acute, very slightly oblique; both surfaces glabrous, dull; length 2.5 to 5.5 in., breadth 1 to 1.7 in. *Panicles* shorter than the leaves; the lateral branches short, slender, few-flowered, clothed, especially towards the extremities, with short, black glandular hairs. *Calyx* much shorter than the corolla, the segments sub-erect, ovate, acute. *Petals* thin, erect, linear, glabrous inside, glandular outside, .35 in. long. *Stamens* about as long as the sepals, alternating with very minute entire glands. *Fruit* as in *E. longifolia*.

Penang; Perak, not so common as the last.

This species comes very near *E. longifolia*, Jack., the chief distinction being in the flowers. The branches are also very much thinner than those of *E. longifolia*, and they are glabrous; the panicles have shorter and fewer-flowered branches.

5. IRVINGIA, Hook. f.

Glabrous insipid trees. *Leaves* simple, coriaceous, entire, with deciduous stipules. *Flowers* hermaphrodite, in axillary panicles, ebracteate. *Calyx* small, 4-5-partite, imbricate. *Petals* 4-5, imbricate. *Disc* very large, cushion-shaped. *Stamens* 10, inserted beneath the disc, filaments long, slender. *Ovary* conical, compressed, 2-celled, entire; style simple, terminal; ovules solitary. *Fruit* drupaceous, large, with 1 pendulous exalbuminous seed. Four species—3 Tropical African, and 1 Malayan.

1. *IRVINGIA MALAYANA*, Oliver ex Hook. fil. Fl. Br. Ind. I, 522. Young branches glabrous, striate. *Leaves* coriaceous, glabrous, elliptic, acute, entire, the base rounded; main nerves 14 to 16 pairs, spreading, curved, inconspicuous: length 3.5 to 5.5 in., breadth 1.75 to 2.4 in., petiole .6 to .7 in. *Panicles* axillary, little-branched, shorter than the leaves. *Flowers* small, hermaphrodite. *Calyx-lobes* ovate, obtuse. *Petals* twice as long as the calyx and equal to the stamens, reflexed after flowering. *Disc* large, bearing the conical ovary in the middle of it. *Fruit* a glabrous compressed drupe, 2 in. long and nearly 1.5 in. in diam.

Malacca; Maingay (Kew Distrib.) No. 468.

ORDER XXV. OCHNACEÆ.

Glabrous trees or shrubs. *Leaves* alternate, simple, (very rarely pinnate) coriaceous; stipules 2. *Inflorescence* paniced or occasionally umbellate (rarely flowers solitary), bracteate. *Flowers* hermaphrodite, conspicuous. *Sepals* 4–5, free, imbricate, persistent. *Petals* 5, rarely 4 or 10, free, hypogynous, imbricate, longer than the sepals, deciduous. *Disc* enlarged after flowering, occasionally 0. *Stamens* 4, 5, 8, 10, or indefinite, inserted on the disc, filaments persistent; anthers basifixed, sometimes deciduous, dehiscent longitudinally, or often opening by terminal pores. *Ovary* short, 2-celled, or elongate and 1–10-celled; placenta axile or parietal; style simple, subulate, acute, rarely divided at the extremity, stigmas simple, terminal; ovules 1–2 in each cell, or indefinite, ascending or rarely pendulous, raphe ventral, micropyle superior. *Fruit* indehiscent, drupaceous or baccate, compound; each drupe or pyrene 1–4 seeded; or capsular and 1–5-celled with septicidal dehiscence. *Seeds* solitary, few or numerous; albumen fleshy or 0; embryo straight or rarely curved, radicle superior or inferior.—DISTRIB. Tropical regions of both hemispheres, but chiefly American. Species about 160.

TRIBE 1. OCHNEÆ. *Ovary* 2–10-celled; ovules solitary in each cell. *Seeds* exalbuminous.

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|---|---------------------|--------------------------|
| Stamens ∞ ; flowers paniculate ... | ... | 1. <i>Ochna</i> . |
| Stamens 10; flowers paniculate or umbellate | 2. <i>Gomphia</i> . | |
| Sepals, petals, and stamens 4 ... | ... | 3. <i>Tetramerista</i> . |

TRIBE 2. EUTHEMIDÆ. *Ovary* imperfectly 5-celled; ovules 2 in each cell. *Seeds* albuminous.

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|--------------------------------------|-----|----------------------|
| Stamens 5; with alternate staminodes | ... | 4. <i>Euthemis</i> . |
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1. OCHNA, Linn.

Glabrous trees or shrubs. *Leaves* alternate, simple, serrate, rarely entire, 2-stipulate. *Flowers* large, yellow, in bracteate panicles or umbels. *Sepals* 5, coloured, persistent. *Petals* 5–10, deciduous. *Disc* thick, lobed. *Stamens* ∞ , shorter than the petals, filaments short or elongated; anthers opening longitudinally, deciduous. *Ovary* deeply 3–10-lobed, lobes 1-celled; styles entirely connate or distinct at the apex; ovules solitary in each cell, axile. *Fruit* 3–10 drupes, seated on the broad disc. *Seed* erect, albuminous.—DISTRIB. Tropical Asia and Africa. Species about 28.

1. OCHNA WALLICHI, Planch. in Hook. Lond. Journ. Bot. V, 650. A small tree, with elliptic or elliptic-oblong, sub-crenate, sub-serrate or entire, acute leaves, with cuneate or sub-rounded bases; the main nerves sub-horizontal, faint; length 3 to 5.5 in.; breadth 1.5 to 2.5 in.;

petiole .15 to .2 in. *Stipules* very minute. *Flowers* 1.5 in. in diam., in short lateral panicles, the pedicels 1 in. or more in length. *Sepals* ovate or lanceolate, usually reflexed in fruit. *Petals* larger than the sepals. *Anthers* linear, deciduous, shorter than the filiform persistent filaments. *Styles* longer than the stamens, cuneate to the apex, or the apices free and spreading. *Drupe*s ovoid, about .5 in. long. Hook. fl. Fl. Br. Ind. (excl. syn. *O. stipulacea*, Colebr. MSS.). *O. nitida*, Wall. Cat. 2894 (not of Thunbg.); Planch. in Hook. Journ. Bot. V, 653; Kurz For. Fl. Burm. I, 205. *O. squarrosa*, Kurz Andaman Report IV (not of Linn.). *O. andamanica*, Kurz Andam. Rep. Ed. II, 33; Journ. As. Soc. Bengal, for 1872, pt. 2, 295; For. Flora Burm. I, 205. *O. obtusata*, DC. Wall. Cat. 2805, B.

Andaman Islands.—DISTRIB. Burmah.

Kurz distinguished his species *O. andamanica* by the styles being free and spreading at their apices, while the fruiting sepals are reflexed. But I do not find that these two characters are at all constantly associated. In other respects, Kurz's characters of *O. Wallichii*, and *O. andamanica* are identical. *O. stipulacea*, Colebr., reduced to this by Mr. A. W. Bennett, in Fl. Br. Ind., appears to me to be distinct.

2. GOMPHIA, Schreb.

Glabrous trees or shrubs. *Leaves* alternate, shining, 2-stipulate. *Flowers* yellow, in axillary or terminal racemes or umbels. *Sepals* 5, coloured, persistent. *Petals* 5, imbricate. *Disc* thick, lobed. *Stamens* 10, inserted at the base of the disc, filaments very short, anthers opening by terminal pores. *Ovary* deeply 5-6-lobed, lobes 1-celled; styles connate, stigma simple; ovules solitary in each cell, erect. *Drupe*s 5 or fewer, seated on a broad disc, 1-seeded. *Seed* erect, exalbuminous.—DISTRIB. Chiefly tropical South American: a few in Asia and Africa. Species about 80.

Flowers in diffuse panicles ... 1. *G. sumatrana*.

Flowers in corymbs ... 2. *G. Hookeri*.

1. GOMPHIA SUMATRANA, Jack in Mal. Misc. No. 5, p. 29; Hook. Bot. Misc. II., 77. A tree 22 to 40 feet high; young branches slender, pale. *Leaves* coriaceous, narrowly elliptic-oblong, tapering to each end, the edges serrulate or sub-entire; main nerves numerous, sub-horizontal, very faint, as are the reticulations; intramarginal nerves from base to apex, two or three, rather distinct when dry; length 3.5 to 7 in., breadth 1.15 to 2.25 in., petiole .15 in. *Panicles* terminal, longer than the leaves, branching. *Flowers* numerous, .35 in. in diam. *Sepals* narrowly ovate, veined. *Petals* larger than the sepals, broad, retuse and inflexed at the apex. *Anthers* linear, much longer than

the short filaments. *Ovaries* 5; styles longer than the stamens, quite connate. *Ripe carpels* obovate or reniform, shining. Hook. fil. Fl. Br. Ind. I, 525; Kurz For. Flora Burm. I, 206; Miq. Fl. Ind. Bat. I, pt. 2, 675; Wall. Cat. 2803. *G. sumatrensis*, Planch. in Hook. Ic. Pl. t. 712, and Hook. Lond. Journ. Bot. VI. 2. *Ochna crocea*, Griff. Not. IV. 463. *E? pulcherrima*, Wall, Cat. 2518.

In all the provinces except the Nicobar and Andaman Islands: common.—DISTRIB. Borneo, Sumatra.

This is very near indeed to *G. angustifolia*, Vahl.; the only differences that I can find between the two being that in this the petals are larger, with more reflexed edges, and the panicles are larger and more diffuse.

2. *GOMPHIA HOOKERI*, Planch. in Hook. Lond. Journ. Bot. VI, 3. A tree; young branches dark-coloured. *Leaves* coriaceous, ovate-oblong to oblong-lanceolate, the base narrowed; main nerves faint, much curved upwards, no continuous intramarginal nerve; upper surface shining, the lower dull; length 2·5 to 6 in., breadth 1 to 2 in., petiole 1·5 to 35 in. *Flowers* 35 in. in diam., in lateral or terminal, crowded, minutely bracteolate umbels; the pedicels slender, 5 to 7 in. long. *Sepals* lanceolate. *Petals* very deciduous, about as long as the sepals, oblong, obtuse, not narrowed at the base. *Anthers* deciduous, elongate, about as long as the slender persistent filaments. *Ovaries* 5; styles much longer than the stamens, quite connate. *Ripe carpels* sub-globular or obovoid, smooth, 2 in. diam. Hook. fil. Fl. Br. Ind. I, 525.

In all the provinces except the Nicobar and Andaman Islands.

In the flowers of different individuals, the disc varies in thickness, being in some as thick as the ovaries are long, while in others it is comparatively shallow.

VAR. *corymbosa*; flowers in corymbs, which are sometimes compound; the lengthened rachis of the inflorescence rough from the transverse cicatrices of the fallen bracts; shrubby.

3. TETRAMERISTA, Miq.

Shrubs or trees. *Leaves* very large, coriaceous, entire. *Flowers* in axillary racemes with large foliaceous bracts. *Sepals* 4, imbricate, persistent. *Petals* 4, persistent. *Stamens* 4, the filaments with dilated bases, the anthers with sutural dehiscence. *Ovary* 4-angled, 4-celled, the style entire. *Fruit* baccate, globose; the pericarp leathery.—DISTRIB. Malaya. Species 1 or 2.

1. TETRAMERISTA GLABRA, Miq., Fl. Ind. Bat. Suppl., 534. A glabrous tree 30 to 50 feet high; young branches stout, with shining, rather pale bark. *Leaves* narrowly obovate or oblanceolate, sub-sessile,

the apex obtuse; the base much narrowed, minutely sagittate; upper surface shining, the lower dull, chocolate-coloured when dry; main nerves numerous, sub-horizontal; length 5 to 10 in., breadth 1·25 to 2·75 in., petiole under ·1 in. *Flowers* 1 in. in diam., in long-pedunculate axillary umbellate racemes; pedicels about ·5 in. long, each with a sepal-like bract near the flower. *Sepals* coriaceous, oblong, obtuse. *Petals* linear-lanceolate, about as long as the sepals and reflexed like them. *Stamens* elongate, shorter than the reflexed filaments. *Ovary* ovoid, obscurely 4-angled. *Style* single, stigma minute. *Ripe fruit* ovoid-globose, 1·25 to 1·5 in. long, sub-glabrous, the calyx and corolla persistent; the pericarp thick, fleshy. Bennett in Hook. fil. Fl. Br. Ind. I, 526. *Ancistrocladus? sagittatus*, Wall. Cat. 1055.

Singapore; Wallich. Perak: Wray, Scortechini, King's collector.
DISTRIB. Sumatra.

4. EUTHEMIS, Jack.

Glabrous shrubs. *Leaves* alternate, simple, shining, coriaceous, serrulate, with ciliate deciduous stipules. *Flowers* rose or white, in terminal or leaf-opposed racemes or panicles, bracteate. *Sepals* 5, imbricate, persistent or deciduous. *Petals* 5, longer than sepals, imbricate. *Disc* small, conical. *Stamens* 5, inserted at the base of the disc, with alternate staminodes, anthers opening by terminal pores. *Ovary* semi-5-celled, elongate, viscid; style 1, stigma entire; ovules 1-2 in each cell, pendulous. *Fruit* a berry of 5 pyrenes, each 1-2-seeded. *Seeds* pendulous with a fleshy albumen.—DISTRIB. Species 4; all Malayan.

Leaves spinulose-serrate; fruit white ... 1. *E. leucocarpa*.

Leaves nearly entire; fruit red ... 2. *E. minor*.

1. EUTHEMIS LEUCOCARPA, Jack in Mal. Misc. No. V., p. 16. A shrub 2 to 5 feet high: young branches rather stout, pale, glabrous, lenticellate. *Leaves* oblong-lanceolate, tapering to each end, the edge thickened inside the numerous spinulose serrations; main nerves very numerous, curved at first, then sub-horizontal, indistinct; length 3·5 to 8 in., breadth 1·2 to 2 in.; petiole ·5 to 1·5 in., winged. *Flowers* ·6 or ·7 in. in diam, shortly pedicelled, generally in pairs; bracts ovate, acute. *Sepals* ovate, obtuse, ciliate, the two inner rather smaller. *Petals* longer than the sepals, oblong-ovate, obtuse, reflexed. *Anthers* erect, connivent, subsessile, oblong, acuminate at the apex, style filiform; stigma small, simple. *Berry* snow-white, sub-globular, ·2 to ·35 in. in diam., obscurely angled, mesocarp spongy. Roxb. Fl. Ind. (ed. Carey), II, 303; Planchon in Hook. Ic. Plant. t. 711. Bennett in Hook. fil. Fl. Br. Ind. I, 526; Miq. Fl. Ind. Bat. Pt. 2 p. 675.

In all the provinces except the Andaman and Nicobar islands.
DISTRIB. Malayan Archipelago,

2. *EUTHEMIS MINOR*, Jack in Mal. Misc. No. V, p. 18. A small shrub, similar to the last, but with nearly entire, sub-acute, obscurely-veined leaves, and red fruits. Roxb. Fl. Ind. (ed. Carey), ii, 304; Bennett in Hook. fil. Fl. Br. Ind. I, 526; Miq. Fl. Ind. Bat. I, Pt. 2, p. 675.

Penang and Singapore.—DISTRIB. Malayan Archipelago.

I give Penang and Singapore as localities for this species, on the authority of Hooker's Flora of British India. It is, however, now probably extinct in both; and I have seen no specimens from any locality nearer to them than the island of Bangka. In Jack's time, this plant appears to have been common enough in Singapore. The plant named *Euthemis elegantissima*, by Wallich, although doubtfully placed in this genus by its author, has leaves very like those of *E. leucocarpa*; but the main nerves curve in a very different manner. Wallich never found it in fruit; but in his day plants of it were common in Singapore and the neighbouring small islands. This too appears now to be extinct. The reduction of *E. elegantissima* to *Gomphia sumatrana*, Planch, which was first suggested by Planchon, is in my opinion quite wrong, the leaves of the two being very different.

ORDER XXVI. BURSERACEÆ.

Trees or shrubs, mostly resiniferous. *Leaves* alternate (very rarely opposite), imparipinnate or trifoliolate, stipulate or ex-stipulate. *Inflorescence* racemose or paniculate. *Flowers* regular, small, hermaphrodite or often polygamous. *Calyx* free, 3-6-lobed, imbricate or valvate, often minute. *Petals* 3-6, distinct, rarely connate, imbricate or valvate. *Disc* annular or cupular, or absent, usually conspicuous, free, or adnate to the calyx. *Stamens* as many or twice as many as petals, inserted at the base or margin of the disc, equal or unequal; filaments free or connate at the base, smooth; anthers dorsifixed, rarely innate, 2-locular, dehiscent longitudinally. *Ovary* free, rarely 1-, more often 2-5-celled; style simple, stigma undivided or 2-5-lobed; ovules 2, or rarely 1 in each cell, anatropous, usually pendulous, rarely ascending, micropyle superior, raphe ventral. *Fruit* drupaceous, indehiscent with hard putamen, or separating into 2-5 pyrenes, rarely pseudo-capsular and dehiscent. *Seeds* solitary, usually pendulous, testa membranous, albumen 0; cotyledons usually membranous, contortuplicate, rarely fleshy and plano-convex, radicle superior.—DISTRIB. Tropical regions of both hemispheres; genera 15 to 19. Species about 250.

Calyx, corolla, and stamens 5-merous.

Fruit hard, woody, 3-winged, separating
 into 3 indehiscent pyrenes ... 1. *Triomma*.

Flowers 3-merous.

Flowers polygamous, dimorphous. Fruit ellipsoid, more or less trigonous, with terminal style; endocarp bony, 1-3-celled, usually 1-seeded 2. *Canarium.*

Fruit obliquely globose, 1-celled, 1-seeded. Calyx keeled, the segments large, connivent 3. *Trigonochlamys.*

Flowers hermaphrodite, homomorphous. Fruit ellipsoid or sub-globose, with the stigmatic scar lateral or basal, more or less compressed on two sides, rounded on the third; endocarp rarely bony or woody, 1-celled, 1-seeded 4 *Santiria.*

1. TRIOMMA, Hook. fl.

A tree. *Leaves* alternate, exstipulate, imparipinnate; the leaflets few, opposite, petiolulate. *Flowers* very small, in terminal panicles, polygamous. *Calyx* 5-fid. *Petals* 5, small, valvate? *Stamens* 10 (?) inserted at the base of the 5-lobed disc. *Ovary* trigonous, 3-celled, style short, ovules 2 in each cell. *Fruit* 3-winged, 3-valved, as much as 2-2½ inches long, containing 3 hard woody separable pyrenes.—DISTRIB. A solitary species.

1. TRIOMMA MALACCENSIS, Hook. f. in Trans. Linn. Soc. XXIII. 171; leaflets oblique, ovate-lanceolate, acuminate, entire; drupe ovate-caudate, acutely cuspidate, 2.5 in. long by 2 in. broad: Bennett in Hook. fl. Fl. Br Ind. I, 528. *Arytera*? *macrocarpa*, Miq. Fl. Ind. Bat. Suppl. 199.

Malacca: Griffith, Maingay.

There is an authentic specimen in the Calcutta Herbarium of Miquel's *Arytera*? *macrocarpa*, collected by Teysmann in the Lampongs, Eastern Sumatra. There is no doubt whatever of its identity with this.

2. CANARIUM, Linn.

Resiniferous trees. *Leaves* alternate, imparipinnate, stipulate or exstipulate. *Flowers* bracteate, in terminal or axillary panicles or racemes, dimorphous, polygamous; those with fertile stamens and rudimentary ovaries being smaller, but in larger inflorescences; those with fertile ovary having rudimentary stamens, being larger, but in smaller inflorescences. *Calyx* campanulate, 3-lobed or 3-fid, valvate. *Petals* 3, imbricate below or valvate, usually exceeding the calyx. *Stamens* 6, distinct, inserted on margin or outside of disc, or filaments confluent below and disc absent. *Ovary* 3-celled; ovules 2 in each

cell; style various, or stigma sessile, capitate. *Drupe* usually ellipsoidal, more or less distinctly trigonous, with a 1-3-celled, 1-3-seeded stone; cotyledons often partite, contortuplicate. **DISTRIB.** Tropical Asia, chiefly in Malaya. Species probably about 90.

The genera *Santiria* and *Canarium* are not separated from each other by any bold, well-marked distinction. As regards the Indian species of both genera, I find the following characters the most diagnostic:—

CANARIUM.

Calyx cupular or campanulate.
Petals longer than broad, slightly narrowed to the base.
Disc small, annular, or thin and cupular, or represented only by the tube formed by the united filaments.
Filaments dilated at the base and sometimes united into a tube.
The flowers with fertile anthers (practically the male flowers) smaller than those with fertile ovaries, but in larger inflorescences.

SANTIRIA.

Calyx cupular, never campanulate, sometimes quite flat.
Petals rotund, with very broad truncate bases.
Disc large, cupular, fleshy, often corrugated.
Filaments dilated at the base, but never united into a tube.
Flowers all hermaphrodite and uniform, as are the inflorescences.

In the majority of the species of *Canarium* in which the filaments are united into a tube, I can find no other disc than that tube.

The genus *Trigonochlamys* is also closely allied to *Canarium* and *Santiria*, being distinguished from both by its much larger calyx, depressed-globose ovary, and spherical drupe. In fact the characters of the three genera so overlap each other, that, in my opinion, they must either be kept distinct by characters more or less minute, as Messrs. Bentham and Hooker have done, or united into a single genus. Dr. Engler steers a middle course; he keeps up *Canarium* and *Santiria*, but unites *Trigonochlamys* with the latter, dividing *Santiria* into three sections: (1) *Icicopsis*, with one species (*S. Planchoni*); (2) *Trigonochlamys*, with four species; and (3) *Eu-santiria* with 22 species. The section *Icicopsis* contains one 3-androus plant, which, as it has the dimorphous flowers and inflorescence of *Canarium*, I have transferred to that genus. I admit that the drupes of the plant in question more resemble those of *Santiria* than of *Canarium*: but, in the majority of its characters, it appears to me to agree better with the latter genus. As regards Dr. Engler's section *Trigonochlamys*, it is difficult to see how *Canarium* and *Santiria* are to be kept distinct as genera, if the four

plants which form this section are to be included under *Santiria*; for the flowers of *Trigonochlamys* are really more like those of *Canarium* than of *Santiria*. The separation of *Canarium* from *Santiria* by characters taken from the drupe, in my opinion, fails. The drupe of *Canarium* is defined as 1 inch or more in length, ovoid or oblong-ovoid, never gibbous, boldly trigonous, its sides equal and its endocarp hard thick and strong, 3-to 1-celled, and the scar of the style apical; while that of *Santiria* is usually less than 1 in. long, shortly and obliquely ovoid or sub-globose, often gibbous, the endocarp being thin, coriaceous, sub-ligneous, never bony, 1-celled, and the scar of the style lateral and often approximated to the base. Unfortunately several species from Perak (which in other respects have the *facies* of *Santiria*) have the style-scar quite terminal; while, on the other hand, some species with many of the characters of *Canarium* have drupes of which the endocarp is not more bony than that of several species of *Santiria*. The characters drawn from the flower, which I have given above, do not appear to me to have hitherto had sufficient value attached to them.

By transferring *Santiria Planchoni*, Benn. to *Canarium*; by keeping up *Trigonochlamys* as a genus characterised by its very large calyx, and globose drupe; and by restricting *Santiria* to the plants which form the section *Eu-santiria* of Engler, I venture to think that the study of all the plants concerned will be simplified.

Stamens 3.

- | | | |
|--|--------|--------------------------|
| Leaves sub-coriaceous with bluntly acuminate apices and 10 to 14 pairs of main nerves, flowers .1 in. long, drupes .4 to .5 in. long | | 1. <i>C. Planchoni</i> . |
| Leaves coriaceous, with caudate-acuminate apices and 7 to 9 pairs of main nerves; flowers .2 in. long; drupes 2 to 2.25 in. long | | 2. <i>C. caudatum</i> . |

Stamens 6.

- | | | |
|--|--------|-----------------------------|
| Filaments united into a tube. | | |
| Leaflets glabrous on both surfaces. | | |
| Leaflets 5 to 9 with 7 or 8 pairs of nerves; panicles terminal | | 3. <i>C. parvifolium</i> . |
| Leaflets 11 to 17, with 12 to 19 pairs of nerves; panicles axillary | | 4. <i>C. euphyllum</i> . |
| Leaflets more or less hairy. | | |
| Leaflets 7 to 9, sparsely pubescent on the lower surface when young, main nerves 10 or 12 pairs; panicles axillary | | 5. <i>C. grandiflorum</i> . |

- Leaflets sparsely hispid on both surfaces when young; glabrous, except the hispidulous nerves, when adult; panicles hispidulous 6. *C. pilosum.*
- Leaflets sparsely hispidulous on the upper surface, their under surface and the inflorescence rufous-pubescent or tomentose 7. *C. hirtellum.*
- Leaflets with the midrib tomentose on the upper surface, the whole of the under surface and the panicles rufous-tomentose 8. *C. rufum.*
- Leaflets glabrous on the upper surface, the lower glaucescent, with a few scattered hairs; panicles rusty-tomentose 9. *C. purpurascens.*
- Filaments free.
- Leaflets quite glabrous on both surfaces; petals puberulous outside.
- Stipules persistent.
- Stipules elliptic-oblong, entire ... 10. *C. commune.*
- Stipules pectinately lobed ... { 11. *C. coccineo-bracteatum.*
- Stipules (if any) deciduous ... 12. *C. Manii.*
- Leaflets glabrous or nearly so on both surfaces, petals rusty-pilose or pilose outside 13. *C. Kadondon.*
- Leaflets with the midrib and nerves puberulous on the lower surface.
- Leaflets not glaucous beneath, entire; drupe less than 1 in. long ... 14. *C. rubiginosum.*
- Leaflets glaucous beneath, at least when young.
- Leaflets crenulate or sub-crenulate; drupes 1 in. long ... 15. *C. Kunstleri.*
- Leaflets obscurely and minutely crenate or serrate, drupes about 2 in. long ... 16. *C. glaucum.*
- Leaflets rusty-tomentose or pubescent on the lower surface, the midrib tomentose on the upper 17. *C. secundum.*

Of doubtful position.

Male flowers unknown, but probably

near *C. parvifolium* 18. *C. nitidum*.

1. *CANARIUM PLANCHONI*, King, A tree, 50 or 60 feet high; young branches glabrous, cinereous. *Leaves* 5 to 10 in. long, stipules deciduous. *Leaflets* 7 to 13, thinly coriaceous, oblong-lanceolate or elliptic-oblong, shortly and bluntly acuminate; the base rounded, slightly oblique; both surfaces glabrous, the upper pale when dry and the nervation obsolete, the lower brown with the 10 to 14 pairs of sub-horizontal nerves slightly prominent; length 2 to 4 in., breadth .9 to 1.5 in.; petioles .15 to .3 in., the terminal one longer. *Panicles* numerous, slender, axillary, much shorter than the leaves, pale puberulous; the branches distant, ascending, the small flowers crowded near their apices. *Flowers* .1 in. long, with several very minute deciduous bracteoles just beneath the calyx. *Calyx* campanulate, deeply cleft into 3 ovate, triangular lobes, tomentose outside, glabrous inside. *Petals* slightly larger than the sepals, deltoid, with a short subulate inflected apex, sub-concave, less tomentose outside than the sepals, glabrous inside. *Stamens* 3, connivent; the anthers innate, broadly ovate; filaments shorter than the anthers, flat, dilated at the base and inserted on the edge of the large cupular fleshy disc. *Ovary* in the male flowers imperfect: in the female flowers small, ovate, 3-grooved, glabrous; style terminal, short, 3-grooved, as is the stigma. *Fruit* ovoid, slightly gibbous, globular, glabrous; the persistent style slightly lateral, .4 to 5 in. long. *Santiria Planchoni*, A. W. Benn. in Hook. Fl. Br. Ind. I, 536; Engler in De. Candolle Monogr. Phanerog. IV, 154.

Malacca: Maingay (Kew Distrib.), Nos. 315, 1972; Griffith, Nos. 1152, 1153. Perak: King's collector, No. 5573; Scortechini, No. 2097.

2. *CANARIUM CAUDATUM*, King n. sp. A tree 20 to 40 feet high; young shoots pale brown, lenticellate, all parts except the calyx quite glabrous. *Leaves* 8 to 13 in. long, stipules (if any) deciduous. *Leaflets* 5 to 7, coriaceous, oblong to ovate, tapering to both ends, the apex caudate-acuminate, the edges entire and sometimes slightly undulate; both surfaces glabrous, shining, the reticulations distinct on the upper surface, and the 7 to 9 pairs of ascending curving interarching main nerves pale on the lower; length 3 to 6 in., breadth 1.5 in. to 2.25 in., petioles .4 to .5 in., the terminal one 1.2 to 1.6 in. *Male panicles* terminal, narrowly pyramidal, few-branched, shorter than the leaves, the bracteoles (if any) deciduous. *Flowers* few, at the extremities of the branches, .2 in., long. *Calyx* widely campanulate, the mouth with 3 broad, shallow teeth, minutely pubescent outside, glabrous inside. *Petals* longer than the calyx, imbricate, ovate, acute, the base truncate,

thickened in the middle; the edges thin, both surfaces glabrous. *Stamens* 3; the anthers oblong, shorter than the flattened filaments, the dilated bases of which are attached outside the glabrous fleshy disc from which emerges the oblong tapering rudimentary ovary: style filiform, stigma minute. *Female flowers* not seen. *Ripe drupes* narrowly ellipsoid, slightly clavate, sub-trigonous, 2 to 2·25 in. long and ·6 in. in diam.; persistent calyx small, flat, 3-angled.

Perak: King's collector, Nos. 8554, 10016, 10182, and 10227. Scortechini, No. 454.

This and the next are distinctly separated from all the other hitherto described Malayan species by their triandrous flowers. The leaves and drupes of this are also very characteristic.

3. *CANARIUM PARVIFOLIUM*, A. W. Benn. in Hook. fil. Fl. Br. Ind. I. 536. A tree; young branches slender, dark brown, all parts ultimately glabrous except the flower. *Leaves* 6 to 12 in. long; leaflets 5 to 9, coriaceous, oblong-lanceolate to elliptic, acuminate, entire, the base rounded or slightly narrowed, both surfaces shining; nerves 7 or 8 pairs, spreading, invisible above (even when dry) and very faint below, length 2 to 3·5 in., breadth ·8 to 1·6; petiolules ·1 to ·2 in., the terminal one ·35 to ·65 in.; stipules (if any) deciduous. *Panicles* terminal, slender, the branches few, short, few-flowered, bracteolate. *Flowers* ·2 in. long, slightly longer than the pedicels. *Calyx* campanulate; the mouth truncate, quite entire or faintly 3-toothed. *Petals* much longer than the calyx, imbricate, elliptic, obtuse, concave, puberulous on both surfaces. *Stamens* 6, as long as the petals: anthers oblong, much shorter than the filaments which are subulate, much dilated in the lower third and very slightly united at the base. *Rudimentary ovary* ovoid, tapering into the thin cylindrical style, glabrous. *Female flowers* unknown. *Ripe drupe* ellipsoid, trigonous, glabrous, 1·5 to 1·75 in. long, and ·8 in. in diam. Engler in DeCand. Monogr. Phanerog. Vol. IV, 140.

Malacca: Griffith, No. 1068; Maingay, No. 353 (Kew Distribution). Perak: King's collector, Nos. 2618 and 7870.

The bases of the filaments in Griffith's No. 1068 are less dilated than in those of Maingay's No. 353, or in those of King's collector's specimens; but in other respects the characters agree. This species in externals much resembles *C. nitidum*, Benn.

4. *CANARIUM EUPHYLLUM*, Kurz in Journ. As. Soc. Bengal, 1872, Pt. 2. p. 295. A tree 80 to 90 feet high; young shoots very stout, puberulous. *Leaves* 2 to 3 feet long, the stipules (if any) very deciduous. *Leaflets* 11 to 17, membranous, ovate, ovate-oblong or oblong, opposite, very shortly and abruptly acuminate, the edges glandular-serrulate; the base unequal, rounded or sub-cordate; both surfaces

glabrous, minutely reticulate, the upper shining; main nerves 12 to 19 pairs, spreading, rather straight, interarching very near the edge; length 4 to 10 in., the lower leaflets much the smallest; breadth 2 to 3·5 in., petiolules ·35 to ·6 in. *Panicles* shorter than the leaves, axillary, puberulous or glabrous, their branches only 1 or 2 inches long, few-flowered, sub-corymbose. *Flowers* ¼ in. long. *Calyx* shorter than the petals, tubular, cut for half its length into 3 broad blunt teeth, puberulous on both surfaces. *Petals* oblong, concave and thickened at the apex, minutely tomentose outside. *Stamens* 6, the anthers linear-oblong, shorter than the glabrous filaments which for two-thirds of their length are united into a tube; rudimentary ovary truncate, glabrous, with a few hairs on the top. *Female flowers* not seen. *Ripe drupes* ovoid-ellipsoid, not trigonous, glabrous, 1·75 in. long and ·8 in. in diam., peduncles stout; the persistent calyx 3-angled, woody. Kurz For. Flora Burmah. I, 208. A. W. Benn. in Hook, fil. Fl. Br. Ind. I, 535. Engler in DeCand, Monogr. Phanerog. IV., 123.

South Andaman: Kurz, King's collector. Burmah: in North Arakan, Hildebrand.

The leaflets on the same leaf vary much in size and shape; those towards the base being short and broad, while those towards the apex are oblong. This species is closely allied to *C. bengalense*, Roxb., but its calyx is more deeply toothed; its anthers are shorter and broader; and its leaves although very similar in texture, are longer, have thicker rachises, while the leaflets are serrate and not entire. The young branches of this are moreover nearly twice as thick as those of *C. bengalense*.

5. *CANARIUM GRANDIFLORUM*, A. W. Benn. in Hook, fil. Fl. Br. Ind. I, 533. A tree; young branches stout, pubescent, ultimately glabrous and dark-coloured. *Leaves* 9 to 12 in. long, the rachis glabrous. *Leaflets* thinly coriaceous, 7 to 9, opposite, ovate-lanceolate or elliptic-oblong, acuminate, entire, the base rounded, upper surface glabrous; the lower glabrous or sparsely pubescent, with the 10 to 12 pairs of spreading main nerves prominent; length 3 to 4·5 in., breadth 1·35 to 1·75 in.; petiolules ·2 in. long, the terminal one longer. *Male panicles* little more than half as long as the leaves, puberulous or nearly glabrous, with a few long spreading branches; the flowers few, in distant clusters, shortly pedicelled. *Calyx* shortly campanulate, with 3 broad, blunt teeth, pubescent outside, glabrous inside. *Petals* longer than the calyx, oblong, thick, concave, blunt, pubescent outside, glabrous inside. *Anthers* linear, longer than the filaments, the latter glabrous, dilated, and forming a short tube, rudimentary ovary hairy. *Female flowers* larger than the male, in axillary racemes, or short panicles with racemose branches; the anthers short, ovate; the filaments as in the male. Ovary broadly ovoid, tapering

into the style and like it rufous-pilose; stigma capitate. *Drupe* narrowly ellipsoid, sub-trigonous, glabrous; stone thick, bony, 1.35 in. long. Engler in DeCand. Monogr. Phanerog. IV., 122.

Malacca: Maingay, (Kew Distrib.), No. 312. Singapore: Hullett No. 516.

This is an imperfectly known species. The only male flowers I have seen of it are those in Mr. Hullett's specimen from Singapore. I have seen no ripe drupes. *Canarium dichotomum*, Miq. (*Pimela dichotoma*, Blume Mus. Lugd. Bat. I, 22) closely resembles this as to leaves. But, as neither Blume nor Miquel describes its flowers, it is impossible to decide whether the likeness goes beyond externals. The specific name of this is unfortunate. The flowers described by the author of it are females, and they are not larger than the female flowers of many other species, while they are much smaller than those, for example, of *C. rufum*, Benn.

6. *CANARIUM PILOSUM*, A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 533. A tree 30 to 60 feet high; young branches rufous-pubescent, with strigose hairs intermixed. *Leaves* 12 to 18 in. long. *Leaflets* 3 to 7, thinly coriaceous, opposite, oblong-lanceolate to elliptic, sometimes slightly obovate, shortly and abruptly acuminate, entire or obscurely crenulate; the base cuneate, slightly unequal-sided; both surfaces when young sparsely hispid, when adult almost glabrous except the midrib and 12 or 13 pairs of slightly prominent spreading nerves which are sparsely hispidulous; reticulations distinct beneath; length 4.5 to 5.5 in., breadth 1.5 to 2.5 in.; petiolules .15 to .25 in., the terminal one more than 1 in.; stipules in pairs, subulate, hairy. *Male racemes* axillary, about 6 in. long, hispidulous, interrupted. *Flowers* about .5 in. long, pedicellate, few. *Calyx* much shorter than the corolla, tubular, its mouth nearly entire, minutely tomentose on both surfaces. *Petals* narrowly oblong, thickened and wider upwards, puberulous on both surfaces. *Anthers* linear, about half as long as the filaments which are linear, flattened and united into a tube for about one-third of their length; rudimentary ovary very short, rufous-pilose. *Female flowers* unknown; the fruiting racemes only about 4 in. long, nearly glabrous. *Drupes* narrowly ellipsoid, sub-trigonous, glabrous, 1 in. long, and .5 in. in diam. (unripe). Engler in DeCandolle, Monogr. Phanerog. IV. 121. Wall. Cat. No. 8100.

Malacca: Maingay (Kew Distrib.) No. 302. Singapore: Wallich. Perak: Scortechini No. 424.

This species is very closely allied to *C. hirtellum*, the chief differences being (1) that the calyx of the male flowers of this is almost entire, while in those of *C. hirtellum*, the calyx is deeply 3-toothed; and (2)

that the leaves of this are when young hispidulous, and when adult nearly glabrous; while those of *C. hirtellum* are more or less densely pubescent beneath at all stages.

7. *CANARIUM HIRTELLUM* A. W. Benn. in Hook. fil. Fl. Br. Ind. I. 534. A tree 40 to 60 feet high: the young branches, rachises and under surfaces of the leaves and the inflorescence more or less densely rufous-pubescent or tomentose. *Leaves* 9 to 15 in. long: *leaflets* 5 to 7, the pairs opposite, coriaceous, elliptic, shortly and rather abruptly acuminate, entire or minutely serrulate, the base rounded or sub-cuneate; upper surface shining, reticulate, sparsely hispidulous, the midrib tomentose; main nerves 11 to 13 pairs, spreading, curving, prominent on the lower, depressed on the upper surface; length 4 to 7 in., breadth 1.5 to 3 in.; petiolules .1 to .2 in., that of the terminal one .5 to .75 in. *Male flowers* in axillary or terminal racemes or panicles much shorter than the leaves. *Flowers* .4 in. long, on short stout pedicels, mostly crowded near the ends of the branchlets. *Calyx* campanulate, with 3 broad blunt teeth, tomentose on both surfaces but especially on the outer. *Petals* longer than the calyx, oblong, concave, thickened upwards, sericeous outside, glabrous within. *Anthers* linear, about one-third as long as the glabrous flattened filaments which are united into a tube for half their length; rudimentary ovary very small, rufous-sericeous. *Female flowers* not much larger than the males, the stamens shorter than the pistil, the free part of the filaments very short, the anthers with pubescent edges. *Ovary* broadly ovoid, densely rufous-sericeous; the style about as long, sparsely pubescent. *Stigma* capitate, 3-lobed. *Ripe drupe* narrowly ellipsoid, trigonous, glabrous, 1 to 1.25 in. long, and .4 to .5 in. in diam. Engler in De Candolle Monog. Phanerog. IV, 121; Hooker Icones Plantar. No. 1575. Wall Cat. 8102 and 9047.

Penang; Wallich, Curtis, Nos. 656, 2251. Selangor: Ridley, No. 1869. Perak: King's collector, Wray; common.

8. *CANARIUM RUFUM*, A. W. Benn. in Hook. fil. Fl. Br. Ind. Vol. I, 533. A tree 60 to 100 feet high: young branches, inflorescence, petiolules and under surfaces of the leaves rusty-tomentose. *Leaves* 12 to 15 in. long, the rachises glabrous when adult. *Leaflets* 7 to 11, very coriaceous, opposite, elliptic or broadly oblong, shortly and abruptly acuminate, the edges serrate-dentate to the broad rounded sometimes slightly oblique base; upper surface glabrous except the tomentose midrib, shining, the lower boldly and minutely reticulate: main nerves 12 to 15 pairs, spreading, very prominent beneath; length 3 to 6 in., breadth 2 to 2.75 in., the lowest leaflets the smallest; petiolules .3 to .4 in., that of the terminal leaflet 1.25 to 1.5 in.; stipules not seen. *Male*

branches terminal, shorter than the leaves, very stout, the lateral branches very short, the flowers in dense bracteate clusters at their apices: bracts numerous, broadly ovate, blunt, concave, tomentose outside. *Calyx* very coriaceous, narrowly campanulate with 3 short blunt teeth, sericeous-tomentose on both surfaces. *Petals* longer than the calyx, oblong, concave, tomentose outside except the glabrous edges, glabrous inside. *Stamens* 6: the anthers linear, slightly longer than the filaments which are much dilated in the lower half and slightly united at the base into a short tube inserted outside the fleshy disc; rudimentary ovary short, broad, glabrous. *Female panicles* shorter than the male, but the flowers at least twice as large ($\cdot 5$ in. long); the petals narrower, the anthers much shorter than in the males and the filaments completely united for one-third of their length into a tube; ovary depressed-globular, tomentose, narrowing into the thick tomentose style: stigma discoid. *Ripe drupe* narrowly ellipsoid, sharply 3-angled, glabrous, the apex rather blunt, $2\cdot 5$ to nearly 3 in. long, and 1 to $1\cdot 3$ in. in diam. Engler in De Cand. Monog. Phanerog. IV, 107.

Malacca: Griffith, No. 1143, Maingay, No. 301. Perak: King's collector, Wray, Scortechini; common.

A very distinct species recognizable at once by its very coriaceous many-nerved rusty leaflets, large flowers, and boldly trigonous fruits.

9. *CANARIUM PURPURASCENS*, A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 532. A tree 50 to 70 feet high: young branches densely rusty-puberulous. *Leaves* 8 to 14 in. long; stipules rotund-cordate, rusty-pubescent. *Leaflets* 7 to 9, coriaceous, oblong to elliptic-oblong, rarely obovate-oblong, entire, or slightly serrate towards the abruptly acuminate apex, the base slightly narrowed, upper surface glabrous shining; the lower glabrous and glaucescent, often with a few scattered hairs: main nerves 10 to 14 pairs, spreading; length $2\cdot 5$ to $5\cdot 5$ in., breadth 1 to 2 in.; petiolule $\cdot 2$ to $\cdot 25$ in., that of the terminal one 1 in. or more. *Male inflorescence*; a racemose panicle often branched, rusty tomentose, 9 to 18 in. long; the ultimate branches few-flowered branched cymules. *Bracts* ovate, tomentose, larger than the flower-buds, deciduous; flowers $\cdot 25$ in. long. *Calyx* tubular, tomentose, with 3 broad shallow teeth. *Petals* broadly oblong, acute, concave, tomentose outside, glabrous inside. *Stamens* 6; the filaments much shorter than the narrowly oblong puberulous anthers, dilated at the base and slightly united so as to form a short tube. Disc none. *Rudimentary ovary* turbinate, glabrous, dark-coloured. *Female flowers* $\cdot 5$ in. long, in stout few-flowered racemes or panicles only 2 to 4 or 5 in. long; ovary globular-ovoid, pubescent, narrowed into a short thick style: stigma large, capitate, 3-lobed. *Drupe* elliptic-ovoid, rather blunt at each end,

sub-trigonous, glabrous, 2 in. long and 1.15 in. in diam. Engler in De. Cand. Monog. Phan. IV, 115. Canarium, Wall. Cat. 9046.

Malacca: Griffith (Kew Distrib.) No. 1142, Derry. Singapore: Wallich, Ridley. Penang: Curtis, Nos. 803, 862, 959, 2708. Perak: Scortechini, No. 175, King's collector, Nos. 6181, 7885.

10. *CANARIUM COMMUNE*, Linn. A very tall tree: young branches pale puberulous, or almost glabrous. *Leaflets* 7 to 9, sub-coriaceous, ovate-elliptic, acuminate, entire, the base sub-cuneate, both surfaces glabrous; main nerves 10 to 14 pairs, spreading, rather prominent; length 3 to 5 in., breadth 1.3 to 2 in., petiolules about .5 in.; stipules persistent, elliptic-oblong, puberulous, veined, about 1 in. long. *Panicles* terminal, lax, spreading, minutely puberulous; the flowers clustered at the apices of the branches, their buds enclosed in rotund, very concave, minutely tomentose bracts. *Calyx* campanulate, broadly 3-lobed. *Petals* 3, ovate-rotund, concave. *Stamens* 6, the filaments shorter than the anthers, free; rudimentary pistil (in the male flower) hairy. *Ovary* (in female flower) oblong-globular, glabrous, the style short and thick; stigma 3-lobed (fide Kœnig). *Fruit* ellipsoidal, sub-trigonous, the stone bony, 1- to 3-celled, 2 in. or more long and 1 to 1.25 in. in diam. Kœnig, Ann. Bot. i. 360, t. 7, f. 2; Roxb. Fl. Ind. iii. 137; Blume Mus. Bot. i. 214; Bijl. 1161; DC. Prodr. ii. 79; W. & A. Prodr. 175; Miq. Fl. Ind. Bat. vol. i. pt. 2, 643; Wall. Cat. 8493. Benn. in Hook. fil. Fl. Br. Ind. I, 531. *Sapindus travancorensis*, Wall. Cat. 8047.

Planted in Penang, Singapore and some of the other provinces, but apparently never wild.

Kœnig in his description, which is a very full one, states that the stipules are "crenate, toothed or sometimes fringed." In all the specimens accepted as *C. commune* which I have seen the stipules are entire, and Rumphius thus figures them. For this as well as for other reasons, I suspect that more than one species is included under the name *C. commune*. L.

11. *CANARIUM COCCINEO-BRACTEATUM*, Kurz in Journ. As. Soc. Bengal for 1872, pt. 2, p. 296. A tree: young branches stout, minutely pale-pubescent. *Leaves* 10 to 18 in. long: stipules rather large, puberulous, pectinately lobed. *Leaflets* 5 to 9, opposite, subcoriaceous, broadly ovate, oblong-ovate to oblong, shortly acuminate, setaceous-serrulate or entire on the same tree; the base oblique, rounded, or sub-cuneate: both surfaces glabrous; main nerves 10 to 12 pairs, slightly prominent beneath; length 3.5 to 7.5, breadth 2 to 3 in.; petiolules .2 to .4 in., the terminal one 1.5 in. *Panicles* axillary, shorter than the leaves, deciduously puberulous, their branches rather long and spreading; the flowers crowded towards their apices, rather numerous; bracts longer than the

buds, ovate or oblong-acuminate, tomentose outside, scarlet. *Flowers* .3 in. long, on pedicels about as long as themselves, sub-globose. *Calyx* campanulate, with three deep broad teeth, tomentose outside, glabrous inside. *Petals* longer than the calyx, valvate, ovate, obtuse, puberulous outside, glaberrulous inside. *Stamens* 6; the anthers oblong, about as long as the free flattened glabrous filaments which rise from the edge of the fleshy corrugated disc: rud. ovary minute. *Female flowers and drupe unknown.* Kurz For. Flora Burmah I, 209; A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 536. Engler in De Cand. Monogr. Phanerog. IV, 149.

South Andaman: Kurz, King's collectors.

12. *CANARIUM MANII*, King, n. sp. A tree: young branches slender, pale brown, scurfy-puberulous. *Leaves* 9 to 12 in. long, stipules (if any) deciduous. *Leaflets* 5 to 7, thinly coriaceous, ovate or ovate-rotund, shortly acuminate, entire; the base very broad, rounded or subcordate, never narrowed; both surfaces quite glabrous, shining, the reticulations minute: main nerves about 10 pairs, spreading, rather straight, slightly prominent beneath; length 3.25 to 4.5 in., breadth 1.5 to 2.75 in.; petiolules .2 to .4 in., the terminal one longer. *Panicles* terminal, slender, shorter than the leaves, minutely pubescent; their branches short (1 in. long), corymbose. *Flowers* .25 in. long, few; buds globular, each with an oblong, obtuse tomentose bract longer than itself. *Calyx* tomentose, widely campanulate, with 3 broad, shallow teeth. *Petals* slightly longer than the calyx, broadly ovate, sub-acute, minutely pubescent externally, glabrous internally. *Stamens* 6, anthers oblong, shorter than the free glabrous slightly flattened filaments which are inserted outside the glabrous fleshy lobed disc.; ovary none. *Female flowers unknown.* *Ripe drupes* ovoid-ellipsoid, glabrous, not trigonous, 1 to 1.25 in. long and .6 in. in diam.; the woody persistent calyx flat and 3-angled.

South Andaman Island: Man, King's collectors.

This resembles *C. euphyllum*, Kurz in its fruit, but has very different leaves and panicles: the bracts of the inflorescence in this are moreover brown, not scarlet.

13. *CANARIUM KADONDON*, A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 535. A tree, young branches glabrous. *Leaves* 6 to 12 (rarely 15) in. long; their rachises terete, nearly glabrous, stipules (if any) deciduous. *Leaflets* 7 to 9, elliptic-oblong to elliptic, obtusely acuminate, entire, both surfaces glabrous or nearly so, the base often unequal rounded or sub-cuneate; main nerves 6 to 9 pairs, spreading, incurved, slightly prominent beneath; length 2.5 to 5 in., breadth 1 to 2.25 in.; petiolules .35 to .5 in., the terminal twice as long. *Panicles* sparsely rusty-

tomentose; the lateral branches short and corymbose, minutely bracteolate. *Flowers* globose in bud, about as long as the pedicels; bracteoles minute, subulate. *Calyx* fleshy, cup-shaped, shortly pilose outside, the mouth with three shallow broad teeth. *Petals* valvate, rotund, densely ferruginous, pilose outside, pubescent inside. *Stamens* 6; the anthers broadly ovate, about as long as the filaments which are dilated at the base, free, and inserted outside the broad fleshy lobed glabrous disc. *Ovary* ovoid, glabrous, stigma (in the bud) sub-sessile. *Ripe drupe* ellipsoid-ovoid, apiculate, not trigonous, glabrous, 1·15 in. long and ·6 in. in diam. Engler in DeCand. Monogr. Phanerog. IV., 138.

Malacca: Maingay (Kew Distrib.) No. 365. Perak: King's collector, many numbers. Penang: Curtis Nos. 495, 1432, 1433, 1434; Hullett, No. 186. Pahang: Ridley No. 2575.

A species distinguishable by its globular buds; its petals densely rufous-pilose externally; and by the long slender petiolules of the leaflets.

14. *CANARIUM RUBIGINOSUM*, A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 534. A tree: young branches and inflorescence minutely tawny-tomentose. *Leaves* 9 to 12 in. long, the rachises glabrous when adult; stipules (if any) deciduous. *Leaflets* 5 to 7, coriaceous, elliptic-oblong, shortly and obtusely acuminate, entire, the base rounded or slightly narrowed; both surfaces glabrous when adult, the lower puberulous along the stout midrib and 10 to 13 pairs of spreading curving main nerves, the reticulations also distinct: length 3·5 to 4·5 in., breadth 1·25 to 2 in.; petiolules ·6 in., the terminal one 1·5 in. *Panicles* of male flowers terminal and axillary, 4 to 10 in. long, the branchlets bearing the flowers at their extremities in condensed many-flowered dichotomous cymes. *Buds* globular, ·1 in long, longer than the stout pedicels. *Calyx* a shallow entire cup. *Petals* deltoid, valvate, concave, much exceeding the calyx, minutely tawny-tomentose outside, glabrescent inside as is the calyx. *Stamens* 6, shorter than the petals, inserted on the outside of the lobed cushion-like fleshy disc; the anthers oblong, about as long as the flat free filaments. *Female flowers* unknown. *Ripe drupe* ellipsoid, nearly 1 in. long, and ·6 in. in diam., obscurely trigonous, glabrous. Engler in DeCandolle Monogr. Phanerog. IV, 136.

Malacca: Maingay (Kew Distrib.) No. 309.

15. *CANARIUM KUNSTLERI*, King, n. sp. A tree 60 to 70 feet high: young branches rather stout, pale brown, minutely and deciduously scurfy-tomentose. *Leaves* 14 to 20 inches; stipules deeply lacinate, puberulous, persistent. *Leaflets* 7 to 11, sub-coriaceous, oblong to elliptic-oblong, shortly acuminate, the edges crenulate or sub-entire; the base rounded or sub-cuneate, slightly oblique; upper surface glabrous, the lower glaucous (at least when young), puberulous on the

midrib and nerves, minutely scaly; main nerves 12 to 15 pairs, spreading, curving, rather prominent beneath; length 4 to 8 in., breadth 2.25 to 3.25 in.; petiolules .3 to .4 in., the terminal one twice as long. *Male panicles* terminal, rusty-puberulous, 10 to 12 in. long, spreading, compound, the flowers crowded on the ultimate branchlets; the pedicels short, tomentose, each with 1 or 2 oblong tomentose brown bracteoles which are longer than the globular buds. *Flowers* .3 in. long. *Calyx* shorter than the petals, cut nearly to the base into 3 ovate obtuse spreading lobes, tomentose outside, puberulous inside. *Petals* ovate, tapering to each end (sub-rhomboid), the outer surface keeled, tomentose with glabrous edges, the inner glabrous. *Stamens* 6; anthers oblong, shorter than the slightly flattened free filaments which are inserted outside the glabrous corrugated disc; ruddy; ovary minute or 0. *Female panicles* as large as the male, fewer-flowered and the flowers larger, the bracts at the bases of the branches lacinate; *stamens* rudimentary; ovary ovoid, style short, thick, both glabrous, stigma large and faintly 3-lobed. *Ripe drupes* ellipsoid, rather blunt at each end, glabrous, very slightly trigonous, 1 in. long and .6 in. in diam., the style persistent; the pedicel stout, .6 to .8 in. long, bearing several persistent bracteoles.

Perak: King's collector Nos. 7041, 7393 and 7509; Curtis, No. 2710.

The nearest ally of this is *C. denticulatum*, Blume, but that has much shorter filaments and smaller leaves; its fruit is unknown.

16. CANARIUM GLAUCUM, Blume Mus. Bot. Lugd. Bat. I, 219. A tree 40 to 60 feet high: young branches rather slender, lenticellate, deciduously rusty-puberulous. *Leaves* 12 to 15 in. long, the rachis at first rusty-puberulous, ultimately glabrous. *Leaflets* 7 to 9, oblong or elliptic, acute or shortly acuminate, the edges obscurely and minutely crenate or serrate or sub-entire; upper surface glabrous, the midrib pubescent; the lower glaucous, rusty-pubescent on the midrib and sometimes on the 10 to 14 pairs of rather prominent spreading main nerves. *Stipules* rotund-reniform, .4 in. long. *Panicles* terminal, the male as long as, or longer than the leaves, with lax spreading branches which become shorter upwards. *Male flowers* .2 in. long., in small bracteate clusters at the ends of the branchlets; bracteoles broadly ovate, tomentose outside, deciduous. *Calyx* campanulate with 3 broad shallow blunt teeth. *Petals* longer than the calyx, broadly ovate-oblong, concave, tomentose outside and glabrescent within like the calyx. *Stamens* 6, the filaments shorter than the anthers, free, dilated at the base, attached outside the glabrous disc; rudimentary ovary glabrous. *Panicles of female flowers* shorter than the males, but the flowers two or three times as large. *Ovary* globose and glabrous below, grooved and pubescent upwards and tapering into the style.

Stigma large, capitate, 3-grooved. *Ripe drupe* ellipsoidal, tapering to the top, glabrous and shining, 1·75 to 2·25 in. long and 1 to 1·25 in. in diam., the persistent thickened calyx forming an open sub-entire cup at its base.

Penang: Curtis Nos. 803, 862, 2708. Perak: King's collector, No 7885.

17. *CANARIUM SECUNDUM*, Benn. in Hook. fil. Fl. Br. Ind. I, 532. A tree 30 to 50 feet high; young branches slender, and like the rachises under surfaces of the leaves and inflorescence rusty-tomentose or pubescent. *Leaves* 12 to 18 inches long; leaflets 7 to 9, thinly coriaceous, oblong, shortly caudate-acuminate, minutely serrate-dentate to sub-entire, the base rounded or slightly cuneate, upper surface glabrous except the minutely tomentose midrib; the lower much reticulate; main nerves 10 to 15 pairs, obscure above, bold beneath, curved, spreading; length 3 to 6 in., breadth 1·6 to 2 in.; petiolules of lateral leaflets only ·2 to ·3 in., those of the terminal one twice as long. *Stipules* reniform, densely tomentose outside, ·35 in. long, and about ·5 in. broad. *Panicles* terminal, rather slender, 10 to 18 in. long, and with lateral branches several inches long at the extremities of which the flowers are crowded in little heads; bracts numerous, more or less ovate or oblong, rusty-tomentose, enveloping the buds. *Flowers* sub-sessile. *Calyx* with 3 broad lobes. *Petals* oblong, sub-acute, concave, rusty-tomentose outside, glabrous within. *Stamens* 6, the narrowly oblong anthers longer than the dilated filaments which are inserted outside the disc. *Disc* adherent to the ovoid glabrous rudimentary ovary. *Female flowers* unknown. *Drupe* elongated-ovoid, sub-trigonous, sub-acute, glabrous, about 2 in. long and 1 in. in diam., the pedicel stout and the persistent calyx 3-angled. Engler in DeCand. Monogr. Phanerog. IV., 116. *Canarium*, Wall. Cat. 9046. ? *C. Bennettii*, Engler in DeCand. l. c. 119.

Singapore: Wallich, Hullett, Ridley No. 1812, King's collector No. 345. Malacca: Griffith No. 1141 and 1145, Maingay, No. 300 (Kew Distrib.). Perak: King's collector, Nos. 4330, 6101, 7610 and 10722; Scortechini, No. 2081.

This is allied to *C. rufum*, A. W. Benn., but its leaflets are thinner and the panicles much longer and more slender, with longer branches; and the drupe is much less distinctly trigonous. Dr. Engler has founded his species *C. Bennettii* on Griffith's specimen No. 1141. But on dissection of the flowers of the single specimen of that number in the Calcutta Herbarium, I cannot find that they differ from those of the same collector's No. 1145 which Engler refers to. *C. secundum*, Bennet and I therefore venture to reduce his species to this. The

filaments are slightly conjoined at the base and appear as if joined into a tube, but they are easily separable.

16. *CANARIUM NITIDUM*, A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 532. A tree 30 to 50 feet high; young branches at first puberulous, but speedily glabrous. *Leaves* 7 to 12 in. long, glabrous, the rachis slender and the petiolules rather long. *Leaflets* 7 to 9, coriaceous, shining, oblong, shortly acuminate, quite entire, the base rounded or slightly narrowed; main nerves 7 to 9 pairs, spreading, almost horizontal, very faint; length 3·5 to 6·5 in., breadth 1·2 to 1·8 in.; petiolules ¼ to ⅙ in., that of the terminal leaflet 1 to 1·5 in.; stipules deciduous (not seen). *Fruit* in short terminal racemes: the drupes when ripe ovoid, tapering to each end, glabrous, 1·25 to 1·75 in. long, and about 1 in. in diam. Engler in De Cand. Monog. Phaner. IV, 108; Wail Cat. 8546 *in part*.

Singapore: Wallich. Malacca: Griffith 1147; Maingay No. 358, (Kew Distrib). Perak: King's collector, Nos. 4604, 4263, 5658 and 10916.

Male flowers of this are not known. The ripe drupe is much more ovoid than in the majority of the species, and this is the character by which, so far as the material goes (for male flowers of this are unknown) it is most readily distinguished from *C. parvifolium*, Benn. A flowering specimen recently collected in Singapore by Mr. H. M. Ridley (No. 3799) may belong to this. Ripe fruit from the same tree is required to settle the matter.

2. *TRIGONOCHLAMYS*, Hook. f.

A tree with pustulate tomentose-pubescent branches. *Leaves* alternate, imparipinnate, with opposite petiolulate leaflets. *Flowers* polygamous. *Calyx* large, keeled, with 3 large connivent valvate segments. *Petals* 3, valvate, about equalling the calyx. *Disc* annular. *Stamens* 6, inserted on the margin of the disc; filaments very short. *Ovary* 3-celled, nearly globose; style straight, short, stigma 3-lobed; ovules 2 in each cell, axile. *Drupe* obliquely globose, 1-celled, 1-seeded.—A single Malayan species.

1. *TRIGONOCHLAMYS GRIFFITHII*, Hook. fil. in Trans. Linn. Soc. XXIII, 170, t. XXVII. A tree 50 to 100 feet high: young branches rather slender, sparsely lenticellate, rusty-puberulous. *Leaves* 6 to 12 in. long, their rachises minutely tomentose; leaflets 13 to 15, thinly coriaceous, oblong-lanceolate, acuminate, entire, the base rounded or slightly narrowed: upper surface glabrous except the tomentose midrib, pale when dry; the lower sparsely pubescent, pale brown when dry and the 13 to 15 pairs of sub-horizontal main nerves rather prominent:

length 1·5 to 3 in., breadth ·65 to ·1 in. *Panicles* shorter than the leaves, few-flowered, rusty-tomentose; branchlets and pedicels with linear-oblong bracts. *Flowers* polygamous, ·35 in. long. *Calyx* large, keeled, with 3 deep broad triangular connivent rusty-tomentose segments. *Petals* narrowly elliptic, slightly exserted, densely pale tomentose with a glabrous spot on the base inside. *Stamens* 6, inserted by short filaments on the edge of a thin hypogynous annular glabrous disc, very small in the pistillate flowers. *Ovary* depressed sub-globular, glabrous, the style basi-lateral; the stigma depressed, capitate, obscurely 3-lobed. *Drupe* obliquely sub-globose, glabrous, about ·5 in. in diam. Bennet in Hook. fil. Fl. Br. Ind. I, 539. *Santiria Griffithii*, Engler in DC. Monog. Phanerog. IV, 155.

Malacca; Griffith, No. 1148; Maingay (Kew distrib.) No. 316. Perak; King's collector Nos. 4625, 1828, 8817.

4. SANTIRIA, Blume.

Resiniferous trees. *Leaves* alternate, 3-foliolate or imparipinnate, firm; leaflets opposite, slightly oblique, entire. *Flowers* in uniformly hermaphrodite, axillary or terminal branched panicles; the stipules, (if any) fugacious, bracts usually obsolete, bracteoles minute. *Calyx* cupuliform, 3-lobed or 3-fid, valvate. *Petals* 3, valvate or sub-imbricate, broad and truncate at the base, exceeding the calyx. *Disc* annular, fleshy, adnate. *Stamens* 6, distinct, usually inflexed, inserted on the margin or outside of the disc. *Ovary* 3-celled, with 2 ovules in each cell; style short, stigma capitate or 3-lobed. *Drupe* ellipsoidal or sub-globose, more or less laterally compressed on the ventral side, and the scar of the stigma usually lateral or basal, 1-celled, 1-seeded; the stone crustaceous, rarely woody, *Cotyledons* contortuplicate.—DISTRIB. Malayan Archipelago. Species probably 35.

Panicles longer than the leaves.

- | | | | | |
|---|-----|-----|-----|----------------------------|
| Panicles and leaves glabrous; leaflets 9 to 20 in. long | ... | ... | ... | 1. <i>S. floribunda</i> . |
| Panicles hispidulous-pubescent; leaflets sparsely hispidulous on the lower surface 4 to 8 in. long flowers on long slender pedicels | ... | ... | ... | 2. <i>S. laxa</i> . |
| Panicles puberulous; leaflets glabrous; leaflets 3 to 9 in. long flowers on short pedicels | ... | ... | ... | 3. <i>S. fasciculata</i> . |

Panicles shorter than the leaves.

Panicles solitary, axillary or terminal,
with rather long peduncles.

Branches of the panicles few, lax,
slender, very long and bearing the
flowers on short distant cymules ... 4. *S. puberula.*

Branches of the panicle numerous,
stout, divaricate; the flowers in
corymbose cymes towards their
apices.

Flowers .2 to .25 in. long; ripe
fruit more than 1 in. long ... 5. *S. macrocarpa.*

Flowers .1 in. long or less: ripe
fruit .6 to .7 in. long.

Flower-buds conical ... 6. *S. levigata.*

Flower-buds globular ... 7. *S. oblongifolia.*

Panicles sessile, branching from the base,
sometimes more than one from a leaf-
axil.

Leaflets quite glabrous.

Scar of stigma terminal in the
ripe fruit; leaflets narrowly ob-
long, their main nerves 12 to
14 pairs ... 8. *S. longifolia.*

Scar of stigma of ripe fruit ap-
proximated to its base.

Leaflets oblong to elliptic-
oblong; nerves 10 to 15
pairs ... 9. *S. Wrayi.*

Leaflets elliptic-oblong to
ovate; nerves about 8 pairs
or fewer ... 10. *S. apiculata.*

Leaflets more or less hairy beneath.

Leaflets quite glabrous on the up-
per surface.

Lower surface of leaflets
boldly reticulate and rusty-
pubescent ... 11. *S. costata.*

Lower surface not conspicu-
ously reticulate, rusty-
puberulous when young;
main nerves about 10 pairs 12. *S. conferta.*

Leaflets glabrescent on the upper surface, the midrib tomentose; lower surface densely rusty-tomentose; main nerves 15 to 20 pairs 13. *S. multiflora*.

1. *SANTIRIA FLORIBUNDA*, King n. sp. A tree 20 to 30 feet high: young branches stout, scurfy, rusty-pubescent. *Leaves* 2 or 3 feet long, the rachises flattened and channelled on the upper surface below the lowest leaflets, auricled at the very base, puberulous at first but speedily glabrous. *Leaflets* 13 to 15 or 17, coriaceous, oblong, shortly acuminate; the base rounded, slightly unequal; glabrous on both surfaces, the midrib alone sometimes puberulous on the lower, reticulations minute; main nerves 20 to 30 pairs, spreading, curving at the tips, interarching but slightly; length 9 to 20 in., breadth 2·35 to 5 in.; petiolules very stout, 5 to 7 in. long. *Panicles* 2 to 3 feet long, slender, much branched, striate, glabrous, bearing numerous scattered horizontal short branchlets ½ to 1·5 in. long which bear two or three 3- to 5-flowered cymules. *Flowers* 1 in. long; their pedicels longer, unequal, slender, puberulous, with a few subulate bracteoles at the base. *Calyx* flat, 3-angled, glabrescent. *Petals* erect, deltoid, fleshy, concave, keeled along the middle, glabrous outside. *Stamens* 6, the filaments shorter than the oblong anthers, slightly dilated below, inserted on the outer surface of the edge of the thick fleshy cupular disc. *Ovary* small. *Style* short, stout, 3-angled like the stigma. *Ripe drupes* elliptic, apiculate, glabrous, ½8 in. long and ½5 in. in diam; the peduncles slender, ½5 to ½75 in. long; stigmatic scar terminal.

Perak: King's collector, Nos. 7510, 7632 and 10151.

There are in the Calcutta Herbarium flowering specimens of a species closely allied to this; but in the absence of fruit I hesitate to describe it.

2. *SANTIRIA LAXA*, King. A tree 50 to 70 feet high: young branches, rachises of the leaves, and the inflorescence densely clothed with rusty, hispidulous, spreading and mostly deciduous hairs. *Leaves* 14 to 22 in. long, the stipules (if any) deciduous. *Leaflets* 7 to 9, oblong to oblong-elliptic, sometimes slightly obovate, shortly and abruptly acuminate, the edges entire, the base often unequal-sided, cuneate: length 5 to 8 in., breadth 1·75 to 2·5 in., petiolule ¼4 or ½5 in.; both surfaces reticulate, the upper glabrous, the lower sparsely hispidulous especially on the midrib and nerves: main nerves 12 to 14 pairs, slightly prominent on the lower surface, spreading, curving, interarching near the edge. *Panicles* usually much longer than the leaves, terminal, their branches short, lax, rather few-flowered, the ultimate branchlets gla-

brous, the larger hispidulous-pubescent. *Flowers* .3 in. in diam.,⁵glabrous, shorter than the slender minutely bracteolate pedicels. *Calyx* with 3 broad, spreading, very blunt teeth, much shorter than the corolla. *Petals* 3, thick, slightly keeled on the back, ovate, obtuse. *Stamens* 6, free, about as long as the petals, inserted on the outer margin of the 6-lobed, glabrous, cushion-like disc; anthers ovate, about as long as the thick rather flattened filaments: rudimentary ovary submerged in the disc, small, sub-cylindric, glabrous as is the thick fluted style; stigma 3-lobed. *Female flowers* unknown. *Ripe drupes* narrowly ellipsoid, trigonous, one side wider and flatter than the other two, glabrous, 1 to 1.4 in. long and .6 to .7 in. in diam; stone thin. *Canarium laxum*, A. W. Benn. in Hook. fil. Fl. B2. Ind. I. 535; Engler in DeCand. Monog. Phanerog. IV, 139.

Malacca; Maingay (Kew Distrib.,) No. 366. Perak: King's collector, Nos. 3192 and 3516. Penang: Curtis No. 1431. Pahang; Ridley No. 2451.

The drupes of this have the remains of the stigma terminal, and in this respect they agree technically with the diagnosis of *Canarium*. But they are not equally 3-sided as in that genus, one side being wider and more rounded than the other two. The structure of the flower is not at all that of *Canarium*, and I therefore transfer the species to *Santiria*.

3. *SANTIRIA FASCICULATA*, A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 539. A tree 40 to 50 feet high: young branches at first rusty-pubescent, becoming glabrous, the bark pale cinereous. *Leaves* 10 to 15 in., the rachis terete, at first puberulous, afterwards glabrescent, slightly flattened on the upper surface near the base. *Leaflets* 5 to 7, membranous, elliptic to elliptic-oblong, more or less caudate-acuminate, the base cuneate, both surfaces glabrous; main nerves 7 or 8 pairs, spreading, much curved, interarching, bold and prominent on the lower, inconspicuous on the upper surface; length 4.5 to 9 in., breadth 2 to 3 in.; petiolules .75 to 1 in., much thickened at each end, the terminal one much longer. *Panicles* slender, puberulous, terminal, as long as or longer than the leaves, with few long, narrow, angular, lax branches bearing at intervals short 6- to 10-flowered cymules. *Flowers* .05 in. long; the pedicels unequal, tomentose, bracteolate. *Calyx* cupular, hispid-tomentose outside with 3 bold, deltoid, acute teeth. *Petals* imbricate, slightly longer than the calyx, deltoid, glabrescent. *Stamens* 6, filaments about as long as the broadly ovate anthers and inserted outside the edge of the ring-like glabrous disc. *Ovary* ovoid, glabrous. *Ripe drupes* narrowly and obliquely ovoid, flattened on one side, slightly gibbous at the base, glabrous, the scar of the stigma terminal, .8 in.

long and .6 in. in diam. Engler in DeCand. Monogr. Phanerog. IV, 164.

Malacca : Maingay (Kew Distrib.) No. 307. Penang ; Curtis No. 1544. Perak : King's collector, Nos. 3123, 3319, 3716, 3500, 6610 ; Scortechini No. 1988.

4. *SANTIRIA PUBERULA*, A. W. Benn. in Hook. fl. Fl. Br. Ind. I, 537. A tree 30 to 50 feet high : young branches slender, pale gray, at first puberulous afterwards glabrous. *Leaves* 8 to 10 in. long, the rachises glabrescent or glabrous, terete, flattened on the upper surface just above the base. *Leaflets* 5 rarely 7, thinly coriaceous, elliptic to oblong, acute or shortly acuminate, the base slightly cuneate ; upper surface quite glabrous ; the lower minutely puberulous, reticulate, the 9 to 11 pairs of spreading, curving, interarching nerves prominent : length 4 to 6 in., breadth 1.5 to 2.5 in. ; petiolules .4 to .6 in. long, the terminal one 1 to 1.75 in., all swollen at the upper end. *Panicles* terminal or axillary, shorter than the leaves, minutely tomentose, with a few lax spreading branches bearing rather distant, 5- to 8-flowered, sub-sessile cymules. *Flowers* about .05 in. long, the pedicels about as long, unequal, stout, tomentose. *Calyx* cupular ; with 3, deltoid, acute teeth, tomentose outside. *Petals* valvate, ovate-rotund, concave, with a slight inflected point at the apex, glabrous, much longer than the calyx. *Stamens* 6 ; filaments longer than the ovate anthers, inserted on the edge of the crenulate fleshy disc : ovary ovoid, glabrous. *Ripe drupes* narrowly ellipsoid, straight on one side, curved on the other, obscurely 3- or 4-angled, glabrous, the scar of the stigma terminal ; length .75 in., diam. .35 in. Engler in DC. Mon. Phan. IV, 161.

Perak : Wray, No. 3210 : King's collector, No. 3438, 3529, 6832.

This comes very near to *S. fasciculata*, A. W. Benn., and I much doubt its being really distinct from that species.

5. *SANTIRIA MACROCARPA*, King n. sp. A glabrous tree, 40 to 70 feet high : young branches with brown lenticellate bark. *Leaves* 5 to 9 in. long, the rachis slightly flattened on the upper surface near the base. *Leaflets* thinly coriaceous, oblong-elliptic to obovate or sub-rotund, very shortly and bluntly apiculate ; the base cuneate, rarely rounded ; main nerves 7 or 8 pairs, spreading, slightly curved, interarching boldly, slightly depressed on the upper surface (when dry) and sub-prominent on the lower ; length 3 to 4.75 in., breadth 2 to 2.75 in. ; petiolules .35 to .5 in., the terminal one 1 in. or more. *Panicles* axillary, solitary, shorter than the leaves, with distant lateral branchlets .5 to 1 in. long and bearing at their apices 2- to 6-flowered bracteolate cymules. *Flowers* .2 to .25 in. long. *Calyx* thick, deeply cupular or sub-campanulate, with 3 bold triangular lobes, glabrescent. *Petals* twice as long as the calyx, fleshy,

glabrous, broadly oblong, very concave, the apex much thickened and deeply inflexed and the sides partly inflexed to form a kind of hood. *Stamens* 6; the filaments much shorter than the oblong anthers, lanceolate, dilated at the base and inserted outside the quadrate lobes of the thin ring-like disc. *Ovary* ovoid-globose, glabrous, tapering into the short thick style: stigma discoid. *Ripe drupes* obliquely ovoid, flattened on one side, glabrous, 1.25 to 1.5 in. long, and about .75 in. in diam; peduncle slender, .5 to 1 in. long, scar of stigma terminal.

Perak: King's collector, Nos. 5304, 5580 and 7298.

6. *SANTIRIA LAEVIGATA*, Blume Mus. Bot. I, 211. A tree 50 to 100 feet high: young branches dark-coloured, lenticellate, glabrous. *Leaves* 9 to 17 in. long, glabrous: the rachises flattened below the lowest leaflet and channelled at the base. *Leaflets* coriaceous, elliptic-oblong to oblong, shortly acuminate; the base usually rounded or sub-cordate, but sometimes narrowed and sub-oblique: both surfaces reticulate, the lower brown when dry: main nerves 11 to 17 pairs, sub-horizontal, slightly prominent on the lower surface; length 4.5 to 9 in., breadth 1.5 to 2.8 in., petiules about .5 in. *Panicles* shorter than the leaves, axillary or slightly supra-axillary, solitary, 6 to 8 in. long (including the rather long peduncles), spreading; the branches ascending, puberulous near the apices where the flowers are crowded in conical ebracteolate cymes. *Flowers* less than .1 in. long, shorter than the pedicels. *Calyx* cupular, the mouth almost entire or waved, minutely tomentose outside. *Petals* deltoid-rotund, the apex inflexed, valvate, glabrous. *Stamens* 6; anthers ovate, about as long as the filaments which are inserted by dilated bases outside the ring-like disc: rudimentary ovary small, ovoid. *Female flowers* not seen. *Ripe drupes* .6 in. long, glabrous, broadly ovoid, blunt, flattened on one side, the remains of the stigma near the apex of the flattened side, peduncle .5 in. long. A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 538; Engler in DeCand. Monog. Phanerog. IV, 165. *Canarium laevigatum*, Miq. Fl. Ind. Bat., Vol. I, Pt. 2, p. 648. *Canarium altissimum*, Herb. Korth.

Malacca; Griffith No. 1149, Maingay. Perak; King's collector, Nos. 4438, 5441, 5839 and 7961; Scortechini.—*DISTRIB.* Sumatra.

The leaves of this vary a good deal as to the number of the main nerves and as to the shape of the base, some having broad and even sub-cordate while others have cuneate bases.

7. *SANTIRIA OBLONGIFOLIA*, Blume in Mus. Bot. Lugd. Bat. I, 211. A tree 50 to 80 feet high: young branches pale, lenticellate, at first scurfy, afterwards glabrous. *Leaves* 12 to 18 in. long; their rachises terete, not winged at the base but slightly flattened, glabrous, the stipules (if any) deciduous. *Leaflets* 7 to 9 in., thinly coriaceous, oblong,

occasionally ovate-oblong or ovate, slightly unequalateral especially at the base; the apex very shortly abruptly and bluntly acuminate, edges entire; base in the oblong forms sub-cuneate, in the ovate forms broad and rounded; upper surfaces glabrous and reticulate, olivaceous when dry; the lower pale brown when dry, very minutely lepidote; main nerves 10 to 13 pairs (in the ovate forms only 7 or 8 pairs), spreading, interarching near the edge; length 4 to 6 in., the ovate forms shorter; breadth 1·75 to 2·25 in.; petiolules ·5 to ·7 in., the terminal one 1·5 in. *Panicles* axillary or terminal, shorter than the leaves, pale scurfy when young, divaricate, cymose, spreading, the flowers crowded near the extremities of the branches, ebracteolate. *Buds* ·1 in. in diam., sub-globular, about as long as the clavate pedicels. *Calyx* campanulate, deeply cut into 3, rotund, deltoid, sub-concave teeth, scurfy outside. *Petals* sub-rotund with a truncate base, slightly concave, longer than the calyx, puberulous outside, glabrous inside. *Stamens* 6. *Anthers* oblong, about as long as the filaments: the latter flattened, narrow, inserted outside the glabrous, thin, fleshy, lobed disc. *Ripe drupes* ovoid, ellipsoid or globose, flattened on one side, oblique, obscurely 3-gonous, glabrous, ·7 in. long, and ·5 in. in diam., the scar of the stigma at the apex of the flattened side. Engler in DeCand. Monog. Phanerog, IV, 162. *Santiria Maingayi*, A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 538: Engler l. c. IV, 165. *Canarium oblongifolium*, Miq. Fl. Ind. Bat. I, Pt. 2, p. 645. *Canarium eupteron*, Miq. Fl. Ind. Bat., Vol. I, Pt. 2, p. 648.

Malacca, (Kew Distrib.) No. 310. Perak: a common tree, King's collector.—DISTRIB. Sumatra, Java, Borneo.

Blume's original description (drawn up from specimens from Java and Sumatra) suits this plant well. An authentic specimen of Miquel's *Canarium eupteron* shows that that species must be reduced here, as must Bennet's *Santiria Maingayi* of which Maingay's specimen No. 310 (Kew Distrib.) is the type. *Canarium sub-repandum*, Miq. is, according to its author, closely allied to *C. eupteron*, Miq. and should probably also be reduced to this.

8. *SANTIRIA LONGIFOLIA*, King n. sp. A tree 10 to 20 feet high: young branches very stout, (·5 to ·75 in. in diam.), their bark brown, glabrous, lenticellate. *Leaves* 2 to 3 feet long, glabrous; the rachises stout, flattened below the lowest leaflets, not winged at the bases. *Leaflets* 11 to 15 pairs, narrowly oblong, gradually tapering to the acuminate apex, the base oblique or rounded; main nerves 12 to 14 pairs, spreading, curved, not prominent: length 9 to 11 in., breadth 1·75 to 2·5 in.; petiolules ·65 to 1 in., stout, enlarged at each end. *Flowers* unknown. *Fruiting panicles* much shorter than the leaves, one or two in the axil of a leaf, unequal, only 4 to 7 in. long, glabrous, the branches short.

Ripe drupes ovoid, flattened on one side, the scar of the stigma terminal, glabrous, 1 in. long, and .65 in. in diam.

Perak: King's collector, Nos. 3594, 6838.

This is so unlike any described species of *Santiria* that, in spite of the absence of flowers on the only specimens I have seen, I have ventured to name it. The small size of the tree and the large size of its leaves make it easy of recognition in the genus.

9. *SANTIRIA WRAYI*, King n. sp. A tree 20 to 30 feet high: young branches very thick, (.75 to 1 in. in diam.) *Leaves* 12 to 30 in. long; the rachises trigonous, channelled in the lower part and almost winged at the base, puberulous. *Leaflets* 13 to 15, membranous, oblong to elliptic-oblong, very shortly and bluntly acuminate; the base rounded, slightly oblique; upper surface shining, olivaceous when dry, the lower pale brown, both glabrous and reticulate; main nerves 10 to 15 pairs, spreading, curving, slightly prominent beneath, length 6 to 11 in., breadth 2.5 to 4 in.; petiolules thickened at both ends, .5 to 1 in., the terminal one more than twice as long. *Panicles* 3 or 4 in. long, several densely crowded in the axils of one leaf, ebracteolate, puberulous or glabrescent below, the ultimate branches scurfy rufous-puberulous. *Flowers* .1 or .15 in. long, shorter than the pedicels. *Calyx* cupular, the mouth with 3, broad, shallow teeth, glabrous, with a few hairs near the edge. *Petals* valvate, rotund, glabrous, rather fleshy. *Stamens* 6; the anthers ovate, longer than the flattened filaments which are inserted on the outside of the edge of the ring-like, fleshy, glabrous, corrugated disc. *Rudimentary ovary* small, ovoid. *Female flowers* unknown. *Ripe drupes* obliquely ovoid, slightly compressed, blunt at each end, .6 to .75 in. long, glabrous, the scar of the stigma approximated to the peduncle, peduncle .5 in. long.

Perak: Wray, Nos. 1423, 2970; King's collector, No. 3689; Scortechini No. 2095.

Allied to *S. conferta*, but with larger leaves and fruit, much less hairy panicles, and perfectly glabrous leaves.

10. *SANTIRIA APICULATA*, A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 537. A tree 20 to 50 feet high: young branches with pale bark, puberulous. *Leaves* 6 to 8 in. long, stipules (if any) deciduous. *Leaflets* membranous, oblong, elliptic-oblong to ovate, more or less bluntly acuminate, the base rounded or cuneate, glabrous on both surfaces and reticulate especially on the lower; main nerves rather irregular, about 8 pairs, ascending, curved, slightly prominent beneath, length 3.5 to 5.5 in., breadth 1.75 to 2.25 in.; petiolules .4 to .6 in., the terminal longer. *Panicles* axillary, slender, shorter than the leaves, more or less pyramidal, glabrous, the flowers small and crowded near the puberulous

apices, bracteoles minute. *Flowers* .1 in. or less in diam., their pedicels twice as long. *Calyx* cupular with 3 broad, shallow, blunt teeth, nearly glabrous. *Petals* rotund, glabrous. *Stamens* 6, inflexed; anthers ovate, about as long as the flattened filaments which are inserted by their slightly dilated bases outside the glabrous fleshy lobed and corrugated disc. *Rudimentary ovary* ovoid, sunk in the disc, pubescent; style very short; stigma 3-lobed, small, terminal. *Female flowers* in panicles like the males, the stamens with broader filaments; ovary broadly ovoid, pubescent, style very short; stigma large, discoid, cupulate, terminal. *Ripe drupes* ovoid-globose, .5 in. long, glabrous, the scar of the stigma near the base, the pericarp thinly coriaceous. Engler in DeCand. Monogr. Phanerog. IV, 163.

Malacca: Maingay, Nos. 303, 308, 314 (Kew Distrib.) Perak: Scortechini 1701: King's collector;—DISTRIB.; Sumatra.

The fruit is remarkable for the close approximation of the remains of the stigma to the peduncle. The venation of the leaves is variable: in many specimens the main nerves bifurcate about half way between the midrib and the edge of the leaf, while in others there is no bifurcation at all.

11. *SANTIRIA COSTATA*, A. W. Benn. in Hook. fl. Fl. Br. Ind. I, 537. A tree: young branches with gray bark, rusty-puberulous at first, ultimately glabrous. *Leaves* 6 to 9 in. long: stipules (if any) deciduous; the rachises broadly channelled above in the lower part, but not winged at the base. *Leaflets* coriaceous, oblong-lanceolate to elliptic, shortly and bluntly acuminate, the base acute or rounded: upper surface quite glabrous and shining, the midrib prominent on both surfaces; lower surface boldly reticulate and with a few scattered hairs; the 9 to 11 pairs of main nerves spreading, curving, very prominent, rusty-pubescent; length 3.5 to 4.5 in., breadth 1.25 to 2 in.; petiolules .35 to .5 in., thickened at both ends. *Panicles* solitary, much shorter than the leaves, (only about 3 in. long) few-branched, rusty-tomentose, deciduously bracteolate. *Flowers* .1 in. long, in small fascicles at the ends of the branchlets; the slender pedicels about as long or longer. *Calyx* cupular, truncate, dentate, glabrescent. *Petals* much longer than the calyx, broadly ovate, blunt, concave, nearly glabrous. *Stamens* 6; the filaments about as long as the anthers, slender and inserted beneath the margin of the outside of the small ring-like disc. *Ripe drupes* narrowly ovoid, slightly flattened on one side, .75 in. long and .5 in. in diam., the scar of the stigma apical. Engler in DeCandolle Monogr. Phanerog. IV, 157.

Malacca: Maingay (Kew Distrib.) No. 313. Perak: King's collector, No. 7597.

The short rusty-tomentose panicles, and almost glabrous flowers on slender pedicels distinguish this from *S. fasciculata*, to which it is closely allied. The leaves also give diagnostic marks, those of this species having more nerves and being pubescent beneath.

12. *SANTIRIA CONFERTA*, A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 537. A tree: young shoots rather stout (.35 in. in diam.), rusty-puberulous, afterwards glabrous and striate. *Leaves* 12 to 18 in. long; stipules (if any) deciduous, the rachis rufous-puberulous when young. *Leaflets* coriaceous, 9 to 13, oblong to oblong-lanceolate, gradually tapering to the acuminate apex, the base rounded: upper surface glabrous, shining, minutely reticulate, olivaceous when dry; the lower brown when dry, minutely rusty-puberulous when young; main nerves about 10 pairs, spreading, curving, slightly prominent on the lower surface: length 3.5 to 6 in., breadth 1.6 to 2 in., petiolules .6 to .7 in. *Panicles* 3 to 4 in. long, several from an axil and much shorter than the leaves, rufous-pubescent, densely crowded, bracteoles minute; pedicels slightly shorter than the flowers. *Flowers* .1 to .15 in. long. *Calyx* cupular, with 3 shallow broad teeth, rusty-tomentose outside. *Petals* imbricate, rotund, concave, puberulous. *Stamens* 6, inflexed, the anthers ovate, about as long as the flat filaments which are inserted on the edge of the fleshy ring-like disc; *rudimentary ovary* small, glabrous, ovoid. *Female flowers* not seen. *Ripe drupes* obliquely ovoid, dark-coloured, glabrous, rather less than .5 in. long, the scar of the stigma near the base, pericarp stoutly coriaceous. Engler in De Candolle Monogr. Phanerog. IV, 160.

Malacca: Maingay (Kew Distrib.) No. 306, Griffith No. 1150.

This is readily distinguished by its crowded condensed rufous-tomentose panicles and small glabrous fruit.

13. *SANTIRIA MULTIFLORA*, A. W. Benn. in Hook. fil. Fl. Br. Ind. I, 538. A tree, 60 to 100 feet high: young branches rather stout (.35 to .5 in. in diam.), densely and minutely rusty-tomentose like the rachises and under surfaces of the leaves and the inflorescence. *Leaves* 9 to 15 in. long; the rachises terete in the upper part, but channelled near the base. *Leaflets* 5 to 7, coriaceous, oblong or elliptic-oblong, tapering slightly to the shortly acuminate apex; the base cuneate or obliquely rounded; upper surface glabrescent except the tomentose midrib and 15 to 20 pairs of sub-horizontal main nerves which are bold and prominent on the lower surface; length 4.5 to 10 in., breadth 2 to 3 in., petiolules .4 to .5 in. *Panicles* axillary or terminal, solitary, shorter than the leaves, ebracteolate, (? bracteoles caducous) spreading. *Flowers* crowded at the extremities, .1 in. long, slightly longer than their tomentose pedicels. *Calyx* a shallow cup, the mouth almost entire or with 3 shallow wavy teeth, tomentose outside. *Petals* much longer than the

calyx, slightly imbricate, thick, broadly ovate, obtuse, with short slightly inflexed apical appendix, glabrous. *Stamens* 6, the ovate anthers about as long as the thick flattish filaments which are inserted on the edge of the thick fleshy ring-like disc: *rudimentary ovary* ovoid, minute. *Female flowers* not seen. *Ripe drupes* ovoid-globose, flattened on one side, .75 in. long, glabrous, the scar of the stigma below the apex of the flattened side. Engler in DeCand. Monogr. Phanerog. IV, 160.

Malacca: Griffith, No. 1151; Maingay (Kew Distrib.) No. 305. Perak: King's collector.

I quite agree with the author of this species that, when better material of *Santiria tomentosa*, Blume (Mus. Lugd. Bat. I, 211), shall be forthcoming, the two will probably be found to be identical.
